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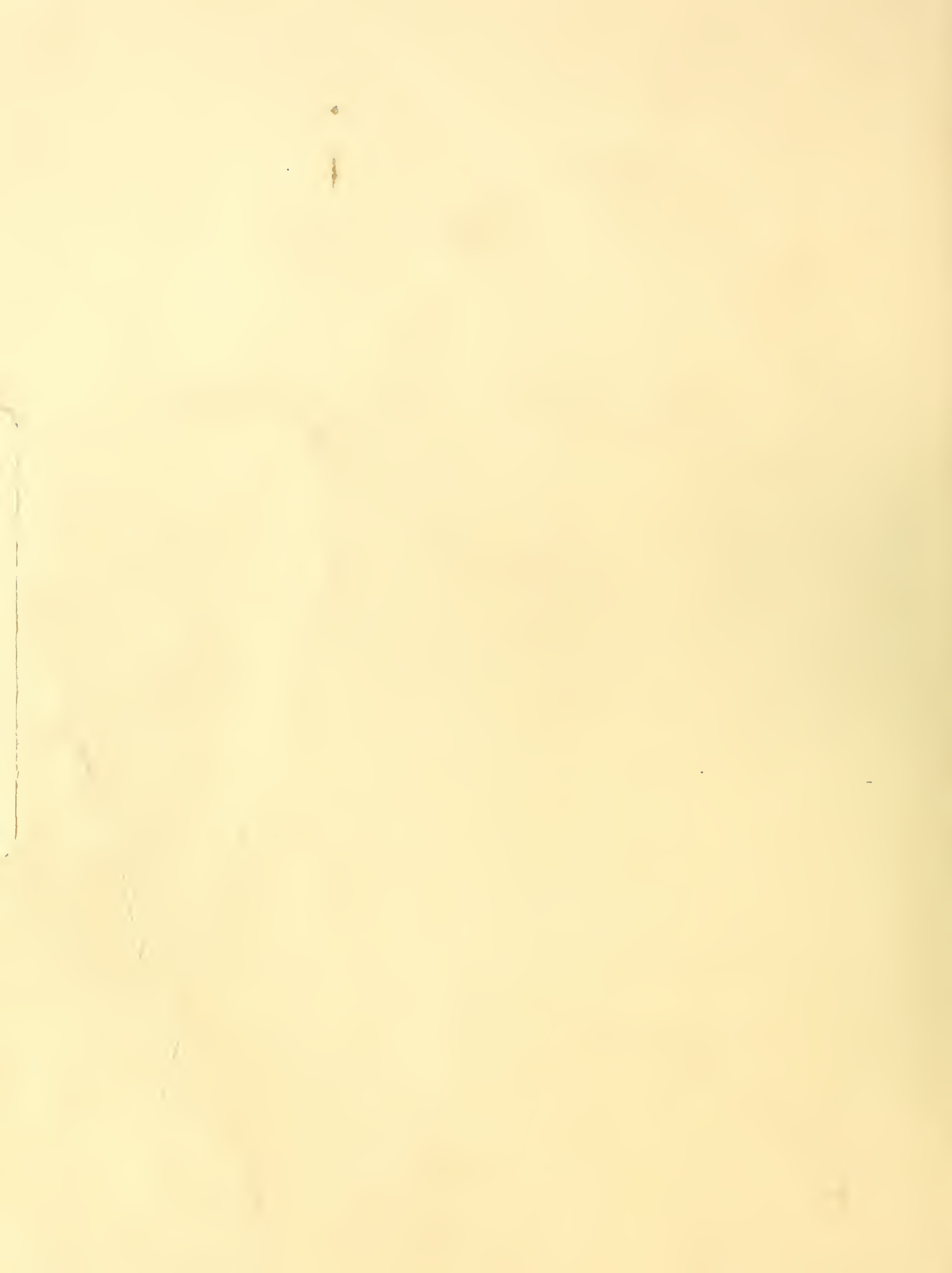
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United States
Department of
Agriculture

Economic
Research
Service

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September 1984

Feed

Outlook and
Situation Report

Large sorghum crop
in prospect

Contents

Summary

The domestic feed grain supply for 1984/85, based on August 1 conditions, will total about 263.5 million metric tons—235.3 million of new-crop grains, 27.5 million carryover stocks, and imports of 700,000 tons. The total supply of 1984/85 would be about 30 million tons larger than available during 1983/84, but 55 million less than the record supply of 318.7 million in 1982/83.

This year's corn crop, based an August 1 conditions, is forecast at almost 7.7 billion bushels (194.8 million metric tons), up 84 percent from 1983/84's harvest of 4.2 billion bushels. The 1984/85 area harvested is 71.1 million acres, about 20 million acres more than the payment-in-kind (PIK) reduced area of 51.4 million acres harvested last year. Yield is estimated at 107.9 million bushels compared with last year's drought-reduced yield of 81.0 bushels per acre.

Production of sorghum, barley, and oats will add 40.6 million metric tons to this year's feed grain supply—34 percent more than 1983's production of 30.2 million metric tons. The barley crop is record high, but the oat crop is the smallest since 1881.

The 1984/85 world supply of coarse grains outside the United States is projected to be 588.8 million tons, down about 5 million tons from 1983/84. The production forecast is down about 4 million and carryover stocks are about 1 million tons lower. However, supply in the major exporting Nations probably will be nearly 1 million tons larger than in 1983/84. Production is forecast at 62 million tons, up 3 million tons, but carryover stocks will be down 2 million.

Supply in the major importing Nations is expected to be 287 million tons—down about 8 million tons—mainly because of lower production this year. These countries may increase imports in 1984/85 by 5 million tons, most of which would come from the United States

Grain-consuming animal units (GCAU's) have been below a year earlier since winter and probably will continue low through this winter. Improved livestock/feed price ratios this fall may stimulate an expansion in livestock production, resulting in feed demand increases next spring and summer. Food, seed, and industrial use (FSI) of corn will most likely reach a record 975 million bushels this year, up 77 million from 1982/83. High fructose corn syrup (HFCS) and ethanol for use as a gasoline additive are the major demand factors responsible for this growth. FSI use probably will continue to grow in 1984/85.

The release status of corn Reserves IV and V ended August 1 as a result of a sharp decline in corn prices in late July. However, because prices recovered quickly in early August, Reserve IV was retriggered August 8. Unless rotation of reserve corn and early harvest of new-crop corn provide sufficient corn to meet market needs in late August and September, Reserve V will also probably have to be retriggered.

Planting of this year's corn crop was about 10 days behind average until late May when favorable weather enabled plantings to catch up. The delayed plantings will mean that the corn harvest before October 1 will be smaller than usual.

FEED GRAIN SUPPLY AND USE

Disappearance of feed grains during April-May amounted to 33.9 million metric tons, down 4 million tons from a year earlier and the smallest use for April-May since 1978. Exports of 9.6 million tons exceeded a year earlier by 1.3 million, and food, seed, and industrial (FSI) use of 6.1 million tons was up almost a million. These increases were more than offset by a decline of 6.2 million tons in the feed and residual disappearance—from 24.4 million tons in 1983 to 18.2 million this year.

The 6.2-million-ton decline in the feed and residual disappearance during April-May apparently included a substantial residual component. Disappearance was down 25 percent, compared with only a 2-percent drop in grain-consuming animal units (GCAU's) for the same period. The modest decline in livestock and poultry numbers was substantiated by federally inspected red meat and poultry production for April-May—up 4 percent from a year earlier. About 255,000 more tons of wheat were fed in April-May, but this only accounts for 4 percent of the decline in feed and residual disappearance. Based on the 1973-82 relationship between GCAU's and feed and residual disappearance, this year's April-May feed use is estimated at 19.6 million tons, 1.4 million above the reported amount. The large decline in feed use relative to livestock and poultry numbers may also result, in part, from a large positive residual component in the 24.4-million-ton feed and residual disappearance in last April-May. For April-May of 1983, estimated disappearance, based on livestock and poultry numbers, is 20.4 million tons, 4 million tons less than shown in the supply and demand table.

Use of feed grains during April-May left stocks on June 1 of 70.3 million tons, less than half the 146.4 million on hand last year and the lowest June 1 stocks since 1977. Although feed grain supplies were tight in June, the supply is now being eased by harvest of this year's barley and oat crops. These harvests are expected to add about 20 million tons to the feed grain supply this summer. In addition, this summer's large wheat harvest is taking pressure off the feed grain market. The quantity of wheat to be fed during June-September this year is expected to exceed the 254 million bushels fed last year.

Production of 20.1 million tons added to June 1 stocks gives an estimated feed grain supply for June-September of 90.4 million compared with last year's supply of 164.4 million. Total use during June-September is expected to be close to year-earlier disappearance of 56.7 million tons, with FSI use up, but exports and feed and residual disappearance down slightly. Thus, about 34 million tons of feed grain would be on hand October 1—31 percent of ending stocks for the 1982/83 feed year (October-September) and the lowest since October 1, 1976.

Corn

Total use of corn during April-May was slightly over 1.1 billion bushels, almost 165 million less than a year earlier. FSI use and exports were each up about 30 million bushels. Feed and residual use of 583 million bushels was down 230 million or 28 percent from last year's 813 million. However, most of this large decline in feed and residual disappearance probably is attributable to residu-

al factors. GCAU's on hand during April-May this year were only down about 2 percent from last year. Federally inspected red meat and poultry production during April-May was up 4 percent from a year earlier; egg production was up about 1 percent, but milk production was down 2.6 percent.

Based on the 1973-82 relationship between GCAU's and feed and residual disappearance of corn, the April-May 1983 feed use is estimated at 681 million bushels—132 million less than computed feed and residual disappearance of 813 million bushels. Feed use this April-May is estimated at 654 million bushels—71 million more than the computed amount. Thus, last year there was a large positive residual, but this year the residual was negative.

June Stocks Smallest in 8 Years

Use during April-May left stocks on June 1 of 2.1 billion bushels, less than half of last year's stocks and the smallest June 1 stocks since 1976. Corn imports have been running above a year earlier and probably will continue up until this year's harvest gets underway. However, imports for June-September are not expected to reach a million bushels so that their impact on supply will be negligible. Although a part of the crop is harvested prior to October 1 each year, it does not appear in the supply and disappearance balance sheet until the October-December quarter. Thus, use during June-September is the difference between June 1 and October 1 stocks.

FSI use for October-May totaled 592 million bushels, almost 16 percent greater than a year earlier. Increased demand for high fructose corn syrup (HFCS) and ethanol were the major factors underlying this growth in use. The markets for HFCS and ethanol are expected to continue strong through this summer. Last year, FSI use during June-September required 372 million bushels of corn. Use this June-September probably will bring FSI use for the season to at least 975 million bushels.

A total of 1,490 million bushels of corn were exported through June of this crop year, compared with 1,481 million a year earlier. Through May, this year's exports were almost 50 million bushels ahead of last year, but exports this June only amounted to 112.3 million bushels—40 million less than last year and the smallest exports for June since 1975.

Last year, exports during July-September amounted to 389 million bushels. If the same amount were exported this year, exports for the crop year would total 1,880 million bushels. However, buying interest shifted from old-crop to new-crop corn in July. By late July, new sales for the current marketing year were running below a year earlier; outstanding sales were down 50 million bushels. Total commitments (outstanding sales plus exports) were 71 million bushels less than a year earlier. If new sales for the current year continue to lag behind last year's sales, total exports for the year would fall below the 1982/83 total of 1,870 million bushels—perhaps by 20 million. At the same time, outstanding export sales for the 1984/85 marketing year reached 186 million bushels in late July, slightly ahead of last year.

The GCAU's for June-September are estimated at 40.16 million, down about 2.8 percent from 41.32 million last year. Cattle feeding, hog production, and dairying are all

June-September GCAU's and corn disappearance[1]

Year	GCAU's X_1	Harvest by October 1 X_2	Disap-pearance Y	Estimated use $\hat{Y}$	Error $(Y-\hat{Y})$
	Million units	Million bushels			
1973	42.46	284	1,072	1,074	−2
1974	39.68	658	925	891	34
1975	36.95	1,227	649	675	−26
1976	39.19	1,321	766	749	17
1977	39.25	1,366	792	743	49
1978	40.73	1,090	797	854	−57
1979	41.32	953	900	904	−4
1980	42.47	1,127	953	918	35
1981	41.65	1,312	830	851	−21
1982	40.68	1,008	841	867	−26
1983[2]	41.32	1,009	891	893	−2
1984[3]	40.16	860		873	

[1]The estimated regression equation is:
$$Y = -605.857 + 40.788 \, X_1 - .185 \, X_2; \quad R^2 = .917$$
$$t \text{ value} = \qquad\quad 4.989 \qquad -4.468$$
[2]This year is beyond the estimation period.
[3]Estimated.

Exports and New Export Sales of Corn

Mil. bu.

*Four-week totals ending on dates shown.

down this year, but an increase in broiler production partly offsets this.

Another important factor affecting the feed and residual use of June 1 stocks is the amount of new-crop corn harvested prior to October 1. Although new-crop corn is not statistically added into the supply until the October-December quarter, some of this early harvest is fed prior to October. The feeding of new-crop corn during July-September replaces corn used out of the June 1 inventory and, therefore, lowers the feed and residual disappearance for the quarter.

Plantings this year were similar to 1979 and considerably later than average. Based on 17 major corn-producing States, only 10 percent (8 million acres) had been planted by May 6, compared with 31 percent normally in the ground by that date. In 1979, 13 percent (10.6 million acres) of the area had been planted. Assuming normal growing weather, about 860 million bushels would be harvested prior to October 1 compared with an an average of 1.1 billion the past 4 years and 953 million in 1979.

Based on the relationship above, the feed and residual disappearance of corn for June-September this year would be 873 million bushels. The decrease in GCAU's, from 41.32 million units in 1983 to 40.16 million this year, would decrease feed and residual use about 47 million bushels. However, the decline in harvest prior to October 1, from 1.0 billion bushels last year to an estimated 860 million this year, would add 27 million bushels to feed and disappearance. If GCAU's are less than estimated, or harvest prior to October 1 is greater than estimated, feed and residual use would turn out to be less than estimated by the regression equation.

Price Weakens as Exports Decline

The farm price for corn averaged $3.16 a bushel for the first 5 months of the marketing year. Then, as marketing of payment-in-kind (PIK) corn tapered off in March and purchases for export held strong, the price rose to an average of approximately $3.38 the last half of June.
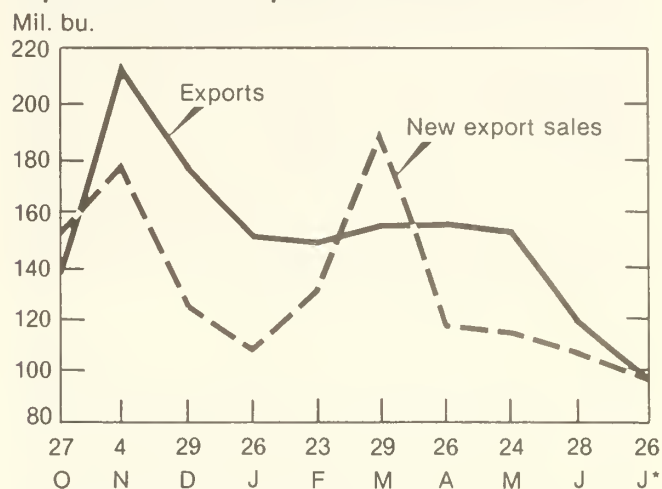
Since June, the price of corn has declined significantly, particularly the last week of July. A number of factors contributed to this price weakness. Probably a major factor has been the drop in exports and export sales for the current market year. The rate of exports dropped 21 percent from May to June and an additional 18 percent from June to July. Similarly, new orders for current year exports during June and July were down about 15 percent from May.

Favorable weather in the major corn-producing regions during July enhanced crop prospects for this year's corn crop, influencing the market by late July.

Release Status Ends for Corn Reserves But Reserve IV Is Retriggered

The drop in the late July corn price carried the 5-day adjusted price down to $3.08 a bushel by the review date of August 1. This price drop resulted in cancellation of the release status for both Reserves IV and V corn agreements. Reserve loans stopped accruing interest and started earning storage payments on August 1. Corn prices rebounded sharply in early August and on the 8th, the release of Reserve IV was announced.

Corn Stocks Down Sharply

Last year, June 1 corn stocks amounted to 4.9 billion bushels, but 3.2 billion were isolated from the market in the farmer-owned reserve (FOR) and the Commodity Credit Corporation (CCC), leaving free stocks of 1.7 billion bushels. Use during June-September amounted to 1.8 billion bushels. The tight free stock situation was eased by a triggering of both reserves in July, a return of about 130 million bushels of corn to farmers as a result of the procurement for the PIK program, and about a billion bushels of new-crop corn harvested prior to October 1.

Stocks on June 1 of this year totaled 2.1 billion bushels, with 600 million in FOR, 200 million in CCC inventory, and 1.3 million of free stocks. Total use for June-September will be about 1.5 to 1.7 billion bushels. In

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Corn stocks on June 1		
Item	1983	1984
	Million bushels	
Total stocks	4,924	2,137
CCC inventory	579	200
Private	4,345	1,937
FOR	2,641	601
Free	1,704	1,336

this case, a significant amount of the FOR will need to be pulled into the market this summer.

FOR Falls Below 500 Million Bushels

On August 8, 480 million bushels of corn were reported as still in the FOR. However, this figure may be on the high side because of lags in reporting and processing reports. An additional 200 million bushels are owned by the CCC. The sum of CCC and FOR stocks exceeds estimated ending stocks; therefore, more corn will have to come out of the reserve to meet market needs during June-September.

About two-thirds of the corn remaining in the FOR is in Reserve V for which the trigger price is $3.25. However, the price at which farmers may be induced to redeem Reserve V is above the trigger price. The loan rate for Reserve V is $2.90 a bushel, but the loan accrues an interest charge during the first year of the reserve contract; after the first year, interest is charged during the time in which the reserve is triggered. Reserve V was in release status from July 26 to February 2, except for November 2 when it went back under reserve status for one day. However, this cancelled the interest charges on Reserve V loans during November and December last year. After February 2, Reserve V was triggered again on March 2 and was in release until August 1. Therefore, most corn in Reserve V has between 15 and 19 months of accrued interest through July of this year, or roughly about 35 to 45 cents a bushel. Therefore, on the national-average basis, the cost of redeeming Reserve V loans is about $3.25 to $3.35. The alternative is to hold on to the corn and turn it over to the CCC at the end of the reserve contract. The farmer must pay the CCC for unused storage payments received whether the corn is redeemed or is turned over to the CCC.

Reserve Rotation May Ease
Supply Situation

Based on June 1 stocks and expected use during June-September, about 400 million bushels may be needed out of the FOR to meet needs. A little over 100 million had been redeemed by August 1. The release of Reserve IV on August 8 adds about 150 bushels more to available stocks. This leaves the potential need to redeem an additional 150 million from Reserve V. However, the need for corn out of Reserve V depends on two factors.

First, farmers can "rotate" reserve grain within 30 days of harvest. This means they can sell or use grain from the reserve if they replace it with new-crop grain within 30 days. The more grain rotated, the less the upward pressure on price during late August and September.

Second, the amount of new-crop grain harvested and moving in market channels or fed prior to October 1 will

be less than normal this year. During the past 4 years, harvest of new-crop corn prior to October 1 averaged over a billion bushels a year. Some harvest is already underway in Florida, Georgia, Louisiana, Mississippi, and Texas. However, Texas is the only State in which the corn harvest is normal. In all the other States, area harvested is below average because of delayed plantings this spring. The delay in plantings will result in less corn harvested prior to October 1 this year than for the past 4 years.

If a combination of reserve rotation and new-crop harvest puts about 300 to 400 million bushels of corn in market channels during August and September, then upward pressure on price may not be sufficient to retrigger Reserve V. This will depend on weather conditions and the willingness and ability of farmers to rotate their reserve corn. Timing will be an important factor.

Eighty-seven percent of June 1 corn stocks on farms was located in the Corn Belt, Lake, and Northern Plains States. These States normally have little harvest prior to October 1; with delayed plantings this year, the harvest season may be a week to 10 days later than normal. States that normally harvest early do not appear to have significant amounts of reserve stocks to rotate.

Weather will be an important factor, not only in facilitating development and maturity but in permitting harvest. If wet weather interrupts harvest during the last half of September, available market supplies would become very tight. A buying surge for old-crop corn for exports in late August or early September would also tighten stocks. An early frost in the North Central region would have a similar impact.

Corn Plantings Catch Up
By Early June

Widespread wet weather in April and early May interrupted field work, resulting in a significant delay in corn planting this year. By May 6, only 10 percent of the area for corn production had been planted, compared with 31 percent normally planted by that date. Favorable weather during the second half of May enabled farmers to catch up, and by June 3 plantings were on schedule.

It is quite often said that late plantings result in a decrease in yield. However, this depends to a large extent on weather. When a crop is planted late, the critical period of rainfall and temperature is also shifted, and if weather cooperates, yields can equal to or exceed normal. A case in point is 1979, when plantings were delayed (as they are this year) but a record yield was obtained. So far this year, weather conditions have been favorable over much of the corn area.

The delayed plantings this year shifted the start of the peak moisture demand about a week. In addition, the start of the tasseling and silking periods was about a week later. However, with plantings caught up to normal by June 3, the weather conditions required for 90 percent of the planted area will be no different from normal by late July and onward. Temperatures in the Corn Belt during July were slightly below average this year, which would tend to improve yields. Precipitation was above normal in Illinois and Iowa but below normal in Indiana, Missouri, and Ohio, with the greatest deviations

Acres Planted per Week: 1984 and Average
Mil. acres
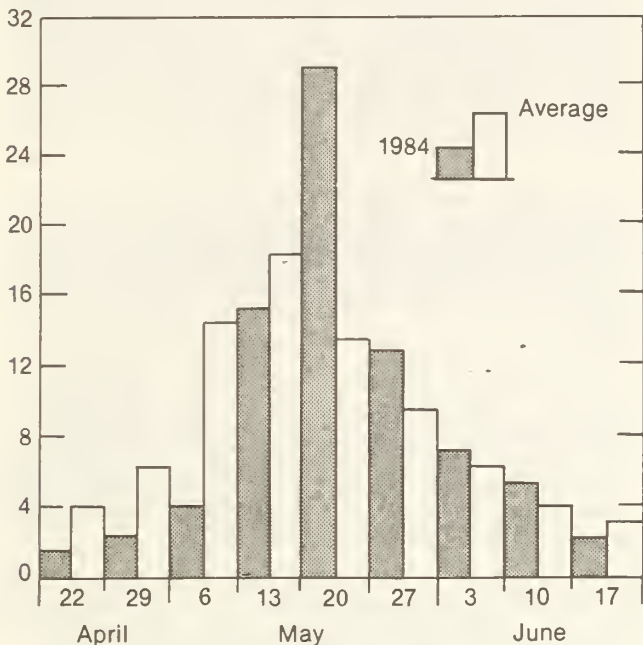
Water Use Rate for Corn: 90% of Plantings
Inches/day
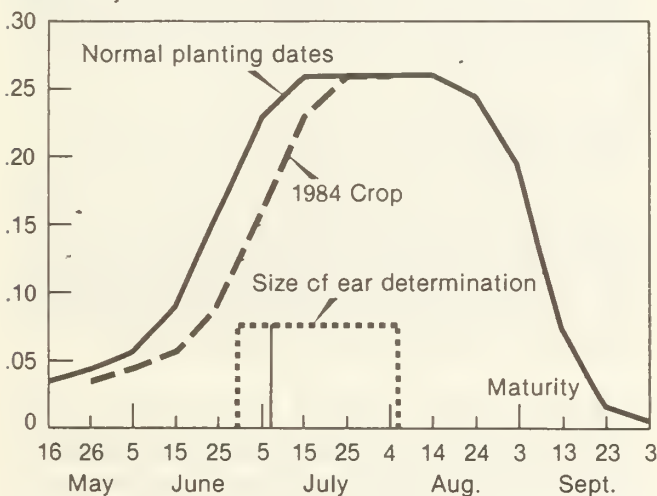
in Iowa and Indiana. Overall, rainfall was a plus factor for yields. Harvested area was reduced about 500,000 acres by flooding in late June.

Corn Crop Estimated at 7.7 Billion Bushels

The USDA's Statistical Reporting Service (SRS) estimated this year's corn crop, based on conditions as of August 1, at 7.7 billion bushels—a yield of 107.9 bushels an acre from 71 million acres to be harvested for grain. Normally, a crop of this size would be considered bearish for prices. However, the impact on the market is modified by the low carryout stocks in sight for this year. The total supply is expected to be about 8.3 billion bushels—a billion larger than last year.

All categories of use are expected to be up in 1984/85. Total use probably will be in the neighborhood of 7.2 billion bushels, compared with this year's 6.7 billion. Thus, carryover stocks would about double to almost 1.1 billion bushels. Carryover stocks of this magnitude would represent about 15 percent of use—below the 1969-82 average of 18.3. The corn price will be lower than during 1983/84 when the market was dominated by drought and PIK. However, farm prices are not expected to be depressed to the loan level of $2.55. Given the supply and demand prospects at the present time, the average farm price for 1984/85 is expected to range from $2.70 to $3.05 a bushel.

Sorghum

Sorghum use for April-May was 100 million bushels, 8 million more than last year. Exports accounted for the gain as feed and residual disappearance was down about 7 million bushels.

Stocks on June 1 amounted to 367 million bushels, with 84 percent of the total in off-farm positions. On-farm stocks only amounted to 60 million bushels, and two-thirds of these were in Kansas and Nebraska. About 72 percent of June 1 stocks—269 million bushels—were tied up in the FOR and CCC. This left free stocks of 102 million bushels—an ample supply compared with last year's free stocks of only 21 million bushels.

Total use this year will be about 650 million bushels, about 81 million less than 1982/83. Exports will total 250 million bushels, slightly more than exported in 1982/83, but domestic feed and residual use is off almost 120 million bushels. Sorghum has been replaced with wheat in livestock and poultry feeding this year, particularly in the Southern Plains. On a feed-value basis, wheat has been underpriced relative to sorghum in the Southern Plains most of this crop year. Consequently, the average farm price for sorghum has dropped to 82 percent of the average farm price of corn, compared with the normal relationship of 92 to 94 percent.

Tight free stocks of sorghum will not be a market factor this summer. Harvest of this year's sorghum crop started in the Rio Grande Valley and Coastal Bend regions of Texas in late June; by late July harvest had moved into Central Texas. The price of sorghum at Houston dropped from $3.30 a bushel in late May to $2.69 a bushel in late July. As sorghum harvest moves north and west in Texas, similar price adjustments will occur, and sorghum and corn will replace wheat in livestock feeding.

Larger Sorghum Crop in Prospect

This year's sorghum crop, based on August 1 conditions, was estimated at 821 million bushels from a harvested area of 14.2 million acres and an average yield of 57.8 bushels per acre. This crop would be substantially larger than last year's drought- and PIK-reduced crop but would be smaller than either the 1981 or 1982 crops.

Some interesting shifts occurred in the geographic distribution of this year's crop. Area planted to sorghum in the six traditional major producing States—Texas, Oklahoma, Kansas, Missouri, Nebraska, and South Dakota—was almost 2 million acres below that planted

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in 1982. These six States planted only 81 percent of total area this year, compared with 92 percent in 1982. Missouri planted 400,000 acres more and Nebraska increased planted area by 50,000 acres, but the other four States all planted less. Most significant was the 35-percent drop in sorghum acreage in Texas—3.9 million planted this year, compared with 6 million in 1982.

Offsetting part of the decline in the traditional sorghum-producing area was an increase in the planted area in some of the Delta and Appalachian States. Six States in these two regions increased planted acreage from 850,000 in 1982 to 1.8 million this year. Farmers have discovered that the drought-resistance capability of sorghum makes it a more desirable second crop following wheat than soybeans. Area planted to soybeans in these six States this year is down 5.3 million acres from 1982 and share of the area planted to soybeans is down 6 percent.

Carryover stocks this year are expected to total 229 million bushels; however, about 245 million will be tied up in FOR (165 million) and CCC stocks (80 million). This implies negative free stocks which is explained by the early availability of new-crop sorghum. Total supply for 1984/85 will be almost 1.1 billion bushels, but the available market supply for 1984/85 will consist mainly of this year's harvest. Total use is expected to be 710 million bushels in 1984/85, up 60 million because of an increase in feed use. However, use will not be large enough to keep stocks from rising during 1984/85.

The combination of a lower loan rate, a larger quantity available to the market, and lower corn prices will hold sorghum prices during 1984/85 well below this year's average farm price. The average price received by farmers during 1984/85 probably will range from $2.40 to $2.75 a bushel.

Barley

Barley Use a Record High in 1983/84

Total disappearance of barley during 1983/84 was a record 543 million bushels. Exports amounted to 92 million bushels; FSI use was 173 million, and feed and residual disappearance was 278 million. Although no individual category of use was a record, the total use exceeded the previous record of 510 million bushels in 1970/71.

The season average price received by farmers for barley in 1983/84 was $2.50 a bushel, an increase of 27 cents a bushel from the 1982/83 average of $2.23. The average farm price of barley during the 1983/84 marketing year was generally low relative to the average price of corn, mainly because of a weaker market for malting barley. The spread between feed barley and malting barley at Minneapolis this past year was 36 cents a bushel, compared with an average of 73 cents a bushel during the preceding 5 years.

Use during 1983/84 left carryover stocks of 189 million bushels on June 1, down 28 million from a year earlier but substantially larger than carryover stocks of either 1981 or 1982. About 105 million bushels of this year's carryover stocks were in the FOR (95 million) and the CCC inventory (10 million).

Large Barley Crop Estimated for 1984

This year's barley crop is estimated at a record 601 million bushels. SRS estimates that about 12 million acres will be harvested this year and that the average yield will be 52.9 bushels an acre. The acreage harvested increased in most States producing barley. However, the increase in the seven major barley-producing States was slightly greater than in the other States.

The barley harvest had started in some States by late July, but the peak harvest activity was still to come. Barley prices declined in June and July, and some additional weakness probably will occur in August as harvest moves into peak activity in the major barley-producing States.

The total supply of barley for 1984/85 will be a record—up almost 70 million bushels from the previous record of 732 million bushels on hand last year. Last year, the United States imported 7 million bushels; with the value of the dollar so high relative to the Canadian dollar, the United States will probably import some barley this crop year even with the record domestic supply.

Total use in 1984/85 is expected to be down slightly from last year's record disappearance. Exports most likely will exceed last year's 92 million bushels, as foreign crops, especially Canada's, deteriorate. The corn supply for this year probably will mean less opportunity for barley to replace corn in livestock and poultry feeding, so feed use is expected to be down somewhat from last year. In addition, in the barley-producing States, the decrease in the number of cows being milked and in hog production will lessen the demand for barley for feeding.

Use for 1984/85 is expected to total about 525 million bushels, slightly below last year's. This would leave about 275 million bushels of barley on hand next June 1.

The farm price of barley was above the year-earlier price in June and early July. However, by late August and September, prices most likely will be below year-earlier ones, and the average for the year will be down substantially. The average price received by farmers for 1984/85 is expected to range from $2.25 to $2.55 a bushel.

There was a tendency to plant a larger proportion of this year's crop to malting varieties. Consequently, the spread between feed and malting barley may continue lower than the average for recent years. In this case, the farm price of barley relative to corn would tend to be lower than usual.

Oats

Disappearance of Oats in 1983/84 Highest Since 1979/80

Use of oats during 1983/84 amounted to 546 million bushels, up 17 million from 1982/83 and the largest use since 1979/80. Increased livestock and poultry feeding accounted for the increase. Exports were a record-low 2 million bushels.

The weighted average price received by farmers for 1983/84 was $1.69 a bushel, up 21 cents from the average

of $1.48 in 1982/83. As in the case of barley, the farm price of oats averaged lower relative to corn than usual.

Carryover stocks of oats on June 1 were 181 million bushels, 39 million under a year earlier and 41 million under the 1973-82 average. Carryover stocks this year were 33.2 percent of use, compared with a ratio of 41.6 percent last year and a 10-year average of 34.6.

Oat Harvest Lowest in 103 Years

This year's oat harvest is estimated at 455 million bushels—22 million under last year's crop and the lowest since the 1881 harvest of 446 million bushels; the 1984/85 harvest is expected to come from 8.1 million acres with a yield of 56.3 bushels per acre. The 1881 harvest required 16.9 million acres with an average yield of 26.4 bushels per acre.

The supply of oats for the 1984/85 marketing year is expected to total 666 million bushels—a record low for the period during which supply and disappearance records have been kept. Last year's supply included imports of 30 million bushels—the largest quantity imported since 1953/54. Imports for 1984/85 probably will be as large as this year unless the Canadian oats crop turns out to be smaller than currently expected. The exchange rate of the U.S. dollar relative to the Canadian dollar will make the United States a good market for Canadian oats.

The combination of an ample supply of corn and hay, fewer cows milked, and the record small supply of oats are expected to result in a record low disappearance for 1984/85 of 518 million bushels. Exports will be about the same as for 1983/84, and the reduction in use will be entirely in the feed and residual category.

Disappearance of 518 million bushels during 1984/85 would leave carryover next June 1 of 148 million bushels—equivalent to about 28.6 percent of use. This would be similar to 1981/82 when the price of oats was record high for oats and also relative to the price of corn. The average price received by farmers in 1984/85 is expected to range from $1.65 to $1.95 a bushel.

Hay

A late spring—particularly in the Western Corn Belt, Central and Northern Plains, and the Mountain States—resulted in prolonged feeding of hay, high prices for hay, and lower carryover stocks this year. The U.S. average price received by farmers for hay in March-May was $82.63 this year compared with $76.07 last year. The disappearance per roughage-consuming animal unit (RCAU) rose to 1.65 tons from 1.61 a year earlier and carryover stocks were reduced to 20.6 million tons—the lowest since 1977.

Good range and pasture conditions in June and July took pressure off the dwindling stocks of hay, and the price of hay dropped below a year earlier in July.

Record Crop in Prospect

This year's hay crop has been estimated at a record 153.4 million tons—a million tons larger than the 152.4 million harvested in 1982 and 12.5 million above last year's

drought-reduced crop of 140.7 million tons. The area harvested this year is estimated at 62.3 million acres—the largest area harvested since 1968. The average yield this year is expected to be 2.46 tons per acre, slightly under the record yield of 2.51 tons in 1982.

Hay Use Expected To Drop

Hay use during 1984/85 is forecast at 145 million tons, down 4.2 million tons from last year. The number of RCAU's is down almost 2 percent, from 90.6 million units in 1983/84 to 89 million this year. Decreases in both milking and beef cattle herds is the primary reason for the decline. If weather conditions this winter and next spring are normal, the disappearance per RCAU probably would be about 1.63 tons per unit, down slightly from 1.65 tons last year when hay feeding was prolonged in some areas by a late spring.

Given the supply forecast of 174 million tons, use of 145 million this year would leave carryover stocks next May of 29 million tons. This would be about the same as the carryover in 1983 and well below the record carryover of 33.3 million tons in 1980. Hay prices during 1984/85 most likely will average below the $76.20 per ton for 1983/84.

Hay (all): Acreage, supply, and disappearance, 1982-84

Item	Units	82/83	83/84[1]	84/85[2]
Acreage harvested	Mil. acres	59.8	59.7	62.3
Yield per acre	Tons	2.50	2.36	2.46
Carryover (May 1)	Mil. short tons	25.2	29.1	20.6
Production	"	149.2	140.7	153.4
Supply	"	174.4	169.8	174.0
Disappearance	"	145.3	149.2	145.0
Roughage-consuming animal units (RCAU)	Mil. units	90.4	90.6	89.0
Supply per RCAU	Tons	1.93	1.87	1.96
Disappearance per RCAU	"	1.61	1.65	1.63

[1]Based on the August 1984 *Crop Production* report. [2]Forecast.

FOOD AND INDUSTRIAL DEMAND

FSI Demand Strong

HFCS and fuel ethanol output were up nearly 20 percent from a year earlier during the October-May period. These two products account for about 45 percent of total FSI corn use. Industry sources predict that HFCS output will continue to increase through August. Some wet-millers have already added additional capacity to meet increased demand during the peak summer period. Ethanol sales are expected to hold steady at over 40 million gallons sold per month, a new record.

Sales of other wet-milled products (glucose, dextrose, and starch) have also increased during the year. By June, starch output had increased by 9 percent over a year earlier and glucose and dextrose by 3 percent. Output of other FSI products remained constant.

In 1984/85, total FSI use is expected to exceed 1 billion bushels. Strong growth is forecast for both HFCS and ethanol. A major wet-miller will be opening a new plant to help meet the increased demand for HFCS. Some of this capacity is already needed so that Coca-Cola and

Pepsi-Cola can complete their substitution of HFCS for sugar up to current approved limits. Approval to further increase these limits are expected in 1984/85.

Ethanol sales will most likely expand in response to lower corn prices and an increase in the Federal excise tax break on ethanol-gasoline blends. The increase from 5 cents to 6 cents a gallon on ethanol blends will take effect on January 1, 1985.

In addition, the tariff charged imported ethanol will be increased from 50 cents to 60 cents a gallon. This increase, along with new State laws excluding imported ethanol from State tax breaks, is expected to significantly decrease the quantity of ethanol entering the United States. In the past few years, Brazilian ethanol has made up 10 to 25 percent of total fuel ethanol sales. U.S. fuel ethanol producers are expected to capture part of this market share. High rail transportation costs will be a limiting factor.

Ethanol sales will most likely benefit from proposed Environmental Protection Agency (EPA) rules that would greatly restrict the amount of lead allowed in gasoline. Ethanol is one of several octane enhancers which can be substituted for lead. Currently, about 45 percent of gasoline sold on the market contains large amounts of lead.

Corn: Food, seed, and industrial use[1]

Product	1980/81	1981/82	1982/83	1983/84*	1984/85**
			Million bushels		
Wet-milled[2]	480	510	540	585	620
Dry-milled[3]	160	162	163	161	160
Alcohol[4]	75	120	180	210	250
Seed	20	19	15	19	20
Total	735	811	898	975	1,050

[1]Year beginning October 1. [2]HFCS, glucose, dextrose, and starch. [3]Grits (for food and beer), cornmeal, flour, cereal, snacks, and Mexican foods. [4]Fuel, industrial, and beverage alcohol. *Forecast. **Projection.

FEED DEMAND

Feed demand this spring and summer has been down from a year earlier. Fewer cattle on feed, decreased farrowings, fewer cows milked, and reduced concentrate feeding per cow milked all contributed to the decline in demand. Feed use in the broiler industry was up this year but not enough to offset the above factors.

A significant regional shift in the feed demand also occurred this year. Placements of cattle on feed in the Southern Plains equalled or exceeded year-earlier placements but placements in the Corn Belt dropped off sharply. The main reason for this shift is that wheat was available at relatively favorable prices so the cost of feeding did not rise as much in the Southern Plains States as in the Corn Belt where feeding utilizes mostly corn.

Lower feed grain prices this fall could stimulate some increase in placements of cattle on feed particularly in the Corn Belt. Feed costs in the Corn Belt probably will become competitive with the Plains States this fall and winter.

According to intentions of hog producers, farrowings will most likely continue under that of a year earlier for the rest of this year. Hog feeding margins became positive in July; with downward adjustments in feed costs this fall, further improvement in feeding margins could result. Consequently, there appears to be a good chance that hog numbers could increase next spring. However, this would not have much of an impact on feed demand until the last half of the 1984/85 feeding year. Broiler, milk, and egg production probably will use more feed next year.

Feed demand in the 1984/85 feeding year probably will be just the opposite of this year. Feed use continued rather strong the first quarter of 1983/84, reflecting production decisions the preceding 3 to 6 months, but then dropped off during the rest of the year. For example, the quarterly GCAU's were above year-earlier numbers during the October-March period but fell under those of a year earlier in the January-September period. For 1984/85, feed demand probably will be under a year earlier during October-March but will exceed year-earlier demand during April-September.

Quarterly grain-consuming animal units[1]

Year	Oct.-Dec.	Jan.-Mar.	Apr.-May	June-Sept.
		Million units		
1981/82	42.71	42.09	41.70	41.87
1982/83	42.05	42.41	42.36	42.59
1983/84	42.35	42.15	41.57	41.42

[1]Revised from special article in the May *Feed Outlook and Situation*, FdS 293.

WORLD COARSE GRAIN SITUATION

Global coarse grain production is forecast to be a record in 1984/85. Low carryin stocks will prevent the total supply of coarse grain from attaining a new high, but it is still estimated to exceed last year's level. Ending stocks could expand significantly as the rebound in coarse grain production exceeds the growth in use. The bulk of the increases in both production and stocks is forecast to be in the United States, although major changes are simultaneously occurring in many countries. Prospects for trade increased substantially for both the United States and the world.

Global Production To Improve

Global coarse grain production is forecast at a record of almost 786 million tons in 1984/85, surpassing 1983/84's level by about 14 percent or 96 million tons. Trend analysis of world coarse grain production (1970/71 through either 1982/83 or 1983/84) provides a range of estimated production from 784 million to 816 million tons. Most of the increase consists of U.S. corn. Foreign output is expected to fall slightly.

Among the major foreign exporters (Canada, Australia, Argentina, South Africa, and Thailand), 1984/85 coarse grain production is forecast at about 62 million tons, compared with only 59 million in 1983/84. This increase of about 5 percent will further enhance export competition in February, March, and April when Southern Hemisphere production enters the market. In addition,

improved grain crop prospects in 1984/85 among the European Community (EC-10) and other Western Europe countries will most likely improve their ability to export coarse grain.

Production losses are forecast for Canada, Australia, and the Soviet Union. A major deterioration has occurred in the Canadian outlook, with their coarse grain production expected to only marginally exceed last year's reduced outturn. Barley output and beginning stocks will both be low, constraining export availabilities. However, Australian production, estimated at almost 8 million tons (over 2 million less than 1983/84), still remains above the last 4 years' average of almost 6.5 million. This indicates that Australia's coarse grain exports could approach or surpass the record 4.6 million tons of 1983/84. The Soviet Union appears headed for the sixth consecutive year of grain harvests, well below the 1976-80 average of 205 million tons. Coarse grain production is estimated at only 89 million tons, 16 million below a year earlier. This, coupled with record livestock inventories and a reduced non-grain feed supply, points to continued dependence on international sources for coarse grain. China's production is forecast to match last year's record level of 93 million tons.

Supply Situation Improves

Global coarse grain supplies (estimated production plus carryin stocks) for 1984/85 are estimated at almost 853 million tons, about 3 percent larger than a year earlier. Supplies in 1982/83, however, were over 40 million tons larger than 1983/84. As was the case with production, most of the increase in coarse grain availabilities is in the United States. Total U.S. supplies, at almost 264 million tons, are up 13 percent from 1983/84. This figure, however, masks what has happened in recent years in the United States. The low level of coarse grain production in 1983/84 was bolstered by carryin stocks of almost 100 million tons. In contrast, 1984/85 carryin stocks are forecast to be only 28 million tons, while production is projected to increase by 73 percent.

A slight decrease in foreign stocks during 1984/85 is expected. Anticipated increases in production among the major foreign exporters of about 3 million tons will probably be channeled evenly through increased feed and non-feed uses. Foreign exports will probably decline from 1983/84 as a result of reduced export availability.

Despite large imports, a poor crop and record livestock numbers may necessitate the Soviets' drawing on depleted stocks. In addition, the Soviet fodder harvest is lagging slightly behind that of a year earlier, and is only on a par with the 1980/81-1982/83 average. This harvest will continue to put pressure on domestic coarse grain availabilities there.

Despite recent estimated declines among the coarse grains in general and corn, in particular, record-tying

production of 93 million tons of coarse grains in China is forecast in 1984/85. China data remain incomplete, but the continued large coarse grain outturn there will probably be shared by both food and feed uses, with perhaps as much as 28 million tons being used as feed. China probably will continue to import about a million tons and may continue to export a small amount.

Trade Prospects Continue Mediocre

World trade in coarse grains for 1984/85, at almost 96 million tons[1], is 5 million tons above that of 1983/84, but remains about 12 million tons behind the record of 1980/81. World coarse grain trade prospects for 1984/85 would be even higher if not for record-large worldwide wheat supplies.

Decreased demand for coarse grains is probably coming from the relative price of wheat compared with other feed grains. Although coarse grain prices have fallen and are expected to continue to fall during 1984/85, the glut of wheat that exists in the world markets has caused wheat prices to fall more substantially than earlier anticipated. As a result, grain importers may be further shifting grain purchases in favor of wheat at the expense of coarse grains.

The trade forecast in 1984/85 for the major exporters of coarse grain, almost 24 million tons, is below that of 1983/84. Of the total, Argentine exports are expected to fall to just over 11 million tons, reflecting recent downward revisions of the sorghum crop. The anticipated high level of coarse grain production in Australia in 1984/85 will most likely permit another year of large exports of about 4.3 million tons.

Trade by the major importers in 1984/85 continues to be bolstered by large purchases from Japan, the Soviet Union, and Western Europe. Prospects in Western Europe are not bright, however, as record wheat and barley production, coupled with a shift to feeding more domestic grains to livestock, has reduced the demand for imported grains. Spain may have barley to export this year.

Soviet imports may rank among the largest in recent years as their production prospects dim. An indication of Soviet intentions may be seen in the summer-long flurry of grain buying from the United States. By the end of July, Soviet purchases of corn from the United States for 1984/85 exceeded the minimum amount specified in the U.S.-USSR Long-Term Grain Agreement. For the year, total Soviet coarse grain imports will be large, but probably will fall short of the record 25.5 million tons imported in 1981/82.

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[1]Not including an estimated 9 to 10 million tons of intra-EC coarse grain trade.

Factors Affecting Quarterly Domestic
Feed Demand for Corn

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Abstract: A quarterly econometric model of the factors and relationships affecting domestic feed use of corn is developed. As expected, prices of corn, soybean meal, and livestock are important determinants of corn feed demand. The measured effect of soybean meal price on corn feed demand in the quarterly framework indicates that corn and soybean meal are complements in animal feeding, not substitutes as many annual studies have implied. Delays in livestock production adjustments and the number of animals in key livestock categories are also important in determining corn feed demand.

Keywords: Demand, feed use, corn, domestic animal feeding, quarterly econometric model, complements, substitutes.

Corn is the most important feed grain in the United States, accounting for more than 80 percent of feed grains fed to livestock and poultry and about 60 to 65 percent of all concentrates fed. Livestock and poultry feeding creates the major demand for corn, with about 60 percent of total corn disappearance used in domestic animal feeding. The feed demand for corn depends on the number and type of livestock to be fed, as well as the feeding rate per head. Livestock production decisions based on past, current, and expected profitability of animal feeding determine the mix of livestock requiring feeding. Concentrate feeding rates are influenced by feed costs, feeding margins (profitability), and changes in technology and environment.

The table shows the importance of different livestock categories to the feed use of corn in 1973 and 1982. From 1973 to 1982, the relative importance of beef cattle has changed the most, declining from 38 to 24 percent of corn feed use, primarily reflecting different positions in the cattle cycle. The corn feed shares of broilers and turkeys have risen, largely because of the growth in the poultry industries.

Domestic feed use of corn by livestock category, 1973 and 1982

Livestock category	Percentage of domestic use	
	1973	1982
Hogs	29	33
Broilers and turkeys	8	12
Hens, pullets, and chickens	9	10
Beef cattle	38	24
Dairy cattle	15	18
Other	1	3

Source: USDA, *Feed Outlook and Situation* (FdS-271), Nov. 1978, pp. 26-27, and FdS-291, Nov. 1983, pp. 29-30.

Feeding rates per head may be adjusted based on market and environmental conditions. To reduce the volume of concentrate feeds fed to beef cattle, the animals may be grazed longer, placed in feedlots later (and at a heavier weight), and marketed at a lighter weight. To a lesser extent, hogs may also be marketed lighter to reduce feed costs.

Economic Factors Affect Demand

From economic theory, the demand for a productive input, such as a specific livestock feed, is explained by that input's price, the competing and complementary inputs' prices, and the output's price. The feed demand for corn then can be explained by the prices of corn, other feeds, and the livestock produced.

A complete description of livestock/feed relationships should take into account the costs and feeding values of all important feed grains and high-protein feeds used in the production of the various meat and animal products. However, the effects of changes in individual grain prices are difficult to distinguish from one another statistically because prices are strongly correlated. For similar reasons, it is difficult to analyze the effects of individual high-protein feed prices independently. Therefore, the econometric model of feed demand for corn developed here includes the prices of corn and soybean meal, but excludes the prices of other high-energy and high-protein feeds. Although price effects are limited to these two feeds, the model explains most of the variation without the complications of collinear explanatory variables. It is also more convenient for forecasting, because fewer prices have to be projected to derive corn feed demand forecasts.

Time of Response Affects Demand

At any given time, the number and type of livestock fed, as well as the feeding rates, affect the current and near-term future demand for feed. The livestock mix and feeding rates respond to current and expected profitability of livestock feeding. However, biological constraints in

livestock production cause delays between changes in profitability and adjustments in producers' feed demand for corn. These delays (lags) must be considered when analyzing quarterly feed demand. Thus, past as well as current and expected profitability need to be related to feed use. In addition, seasonal patterns of feed use caused by environmental stress and animal production cycles are important determinants of quarterly feed demand.

Econometric Model To Explain Feed Demand

The following model of the quarterly feed demand for corn incorporates, with appropriate lags, the major factors previously discussed. Feed and residual disappearance of corn is the dependent variable—the variable the model is designed to explain. Although the feed and residual data include disappearance from waste and shrinkage, as well as reporting and estimation errors, no feed use data are available separately.

Feed and residual use was adjusted before estimation because the corn marketing year has uneven periods—two 3-month periods, one 2-month period, and one 4-month period. This adjustment was done by multiplying use in the April-May quarter by 1.5 and use in the June-September quarter by 0.75. Thus, all 4 quarters of adjusted feed and residual use data are on a prorated, 3-month equivalent basis, thereby allowing the measurement of response to explanatory variables to be comparable across quarters.

The prices of corn, soybean meal, and livestock products are included in the corn feed demand equation as explanatory variables. Several livestock categories were tested for effects on corn feeding. The most significant livestock category, cattle on feed in 13 States, was retained. A 4-quarter lag in feed and residual use of corn was used because of relatively stable seasonality in feeding rates from year to year. The equation was estimated by ordinary least squares using data from June-September 1973 through October-December 1981. The variables are the following:

COUFE: Domestic feed and residual use of corn in the current quarter, million bushels.

COPFM: Average farm price of corn in the current quarter, $ per bushel.

SMPDML1: Average soybean meal price at Decatur (44 percent protein) in the previous quarter, $ per ton.

PR7LVL2: Index of prices received by farmers for livestock, 2 quarters earlier, 1977 = 100.

CAOF: Cattle on feed (13 States) in the current quarter, 1,000 head.

COUFEL4: Domestic feed and residual use of corn, 4 quarters earlier, million bushels.

The estimated regression equation follows with t-statistics (in parentheses) and elasticities, calculated at variable means (in brackets):

$$COUFE = -56.577 - 188.301 \; COPFM - 0.666 \; SMPDML1$$
$$\quad\quad\quad\quad\quad (-4.61) \quad\quad\quad (-1.88)$$
$$\quad\quad\quad\quad\quad [-0.47] \quad\quad\quad [-0.12]$$

$$+ \; 2.856 \; PR7LVL2 + 0.042 \; CAOF + 0.923 \; COUFEL4$$
$$\quad (3.98) \quad\quad\quad (3.02) \quad\quad\quad (18.93)$$
$$\quad [0.33] \quad\quad\quad [0.39] \quad\quad\quad [0.92]$$

$R^2 = 0.94$

$D.W. = 1.90$

The results of statistical analysis show that the estimated equation explains 94 percent of the variation in quarterly feed and residual use of corn. The Durbin-Watson statistic indicates that first-order serial correlation of error terms is not a problem. All estimated coefficients have the expected sign (positive or negative), and all are significant at the 5-percent level (based on a critical t-value of 1.701 at the 5-percent level for a one-tailed test).

Corn price is included in the model with no lags. This structure implies that demand is responsive to corn price changes in the current quarter. The coefficient for corn price has an imputed elasticity of -0.47, which is in the expected range based on previous research on demand for livestock feed.[1] The interpretation of this elasticity is that a 10-percent rise in the price of corn in one quarter will lead to a 4.7-percent decline in feed and residual use of corn in the same quarter.

Soybean meal price is included with a 1-quarter lag. The implied cross-price elasticity between feed and residual use of corn and lagged soybean meal price is -0.12.[2] The

[1]Previous research on feed demand for corn indicates that the own-price elasticity agrees with theoretical expectations and is negative. Although a wide range of elasticities have been reported, most estimates of direct price elasticity for feed grains range from about -0.50 to -0.74 (King, 1958). Because these estimates are from studies using annual data, their longer run response is expected to be stronger than a quarterly one. Butell and Womack (1977) estimated a separate feed demand equation for each of the 4 quarters, allowing different specifications across quarters. They found elasticities for current corn price ranging from about -0.2 to -0.3 and for lagged corn price ranging from about -0.2 to -0.6.

[2]This negative cross-price elasticity is consistent with the relationship estimated between these two inputs in a quarterly soybean meal demand model from Hull, Westcott, and Hoskin (1984). Their equation, shown below, implies a cross-price elasticity between soybean meal use and lagged corn price of -0.18.

$$SMUDT = 124.641 - 7.451 \; SMPDML1 - 286.733 \; COPFML1$$
$$\quad\quad\quad\quad\quad (-6.05) \quad\quad\quad (-2.08)$$
$$\quad\quad\quad\quad\quad [-0.33] \quad\quad\quad [-0.18]$$

$$+ \; 0.120 \; HOSWFL1 + 0.421 \; HOSWFL2 + 19.347 \; PR7LVL1$$
$$\quad (0.70) \quad\quad\quad (2.38) \quad\quad\quad (5.78)$$
$$\quad [0.07] \quad\quad\quad [0.25] \quad\quad\quad [0.57]$$

$$+ \; 21.087 \; HAPFC + 0.216 \; CANPL$$
$$\quad (2.71) \quad\quad\quad (4.16)$$
$$\quad [0.30] \quad\quad\quad [0.29]$$

$R^2 = 0.89$

$D.W. = 2.07$

SMUDT is domestic soybean meal use in the current quarter, 1,000 tons; SMPDML1 is average soybean meal price at Decatur (44 percent protein) in the previous quarter, $ per ton; COPFML1 is average farm price of corn in the previous quarter, $ per bushel; PR7LVL1 is the index of prices received by farmers for livestock in the previous quarter, 1977=100; HAPFC is the average price received by farmers for all hay (baled) in the current quarter, $ per ton; HOSWFL1 is sows farrowing (10 States) in the previous quarter, 1,000 head; HOSWFL2 is sows farrowing (10 States) 2 quarters earlier, 1,000 head; CANPL is net placements of cattle into feedlots (13 States) in the current quarter, 1,000 head.

negative sign on a cross-price elasticity is usually interpreted as an indication of the complementarity between the corresponding factors of production; that is, because feed demand for corn declines as (lagged) soybean meal price goes up, it may be inferred that corn and soybean meal are relatively poor substitutes. Although corn contains some protein, it is fed primarily as an energy source. Soybean meal, on the other hand, is fed for protein content and is a less concentrated source of energy than corn. [3] Previous research (King, 1958, and Brandow, 1961, for example) has generally found a positive cross-price elasticity between high-energy and high-protein feeds. Most of these studies, however, used annual data and may have been reflecting that substitution between corn and soybean meal in aggregate animal feeding is more feasible in the long run as livestock and poultry producers expand or contract, adjusting the mix of animals fed. In a quarter-by-quarter corn feed demand analysis, Butell and Womack (1977) found some quarters with positive cross-price effects between corn feeding and the price of soybean meal. However, the relationship was not stable across quarters, and was represented in various moving average and relative price variables.[4]

The cattle-on-feed variable (CAOF) has a coefficient of 0.042, implying a feeding rate of 42 bushels of corn per head. This compares favorably with the typical feeding operation's rate of about 45 bushels of corn equivalent grain (see Corn Belt Cattle Feeding table, *Livestock and Poultry Outlook and Situation Report*, October 1983). The 13-State cattle-on-feed numbers may also serve as proxy

[3] Allen (1938, p.509) defined substitutes and complements on the basis of the partial elasticity of substitution. The theoretical cross-price elasticity of demand between factors of production, as derived by Allen, depends on the partial elasticity of substitution and the factor shares, as well as the elasticity of demand for the product (in this case, animal products).

[4] Brandow (1961, p.75) suggested that the relationship between demand for high-protein and high-energy feeds is too complex for the simple classification of "substitutes" and "complements." He argued that although soybean meal might be substituted for corn to provide energy, corn cannot be effectively substituted for meal to provide protein.

for long-term cyclical, as well as seasonal, shifts in cattle feeding in all of the United States.

The coefficient of the 2-quarter lagged livestock price index is included to represent expected returns to feeding, and indicates a strong relationship between product price and feed demand. The elasticity of 0.33 means that a 10-percent increase in livestock prices 2 quarters earlier will lead to a 3.3-percent increase in feed and residual use of corn in the current quarter.

The 0.92 coefficient of the 4-quarter lag of feed and residual use of corn indicates a strong relationship between past and current feed demand. The variable also accounts for effects of the stable seasonal pattern in livestock feeding because of environmental stress, grazing conditions, or other annual cycles in the animal product markets.

Model Performance

The figure shows the historical record of the model in estimating domestic feed and residual use of corn over both the estimation period (through calendar year 1981) and the post-estimation period (through calendar year 1983). Because the feed and residual use data were adjusted to an even-quarter basis for the econometric model, the estimates from the model have been readjusted to the uneven-quarter basis used for corn-marketing year data; then these results were compared with the historical series. The model tracked reported feed and residual use well through the estimation period, as was indicated by the R^2 of 94 percent. The relative mean absolute error (RMAE) of 6.1 percent for the estimation period was fairly low. For the post-estimation period, 1982 through 1983, the RMAE was higher at 10.2 percent.

For most of the estimation period, the model tended to under-predict October-December feed and residual use. Beyond the estimation period, the model over-predicted October-December feed and residual use for 1982, but under-predicted it again for 1983. The over-prediction of

Demand Model Tracks Corn Feed Use
Million bushels
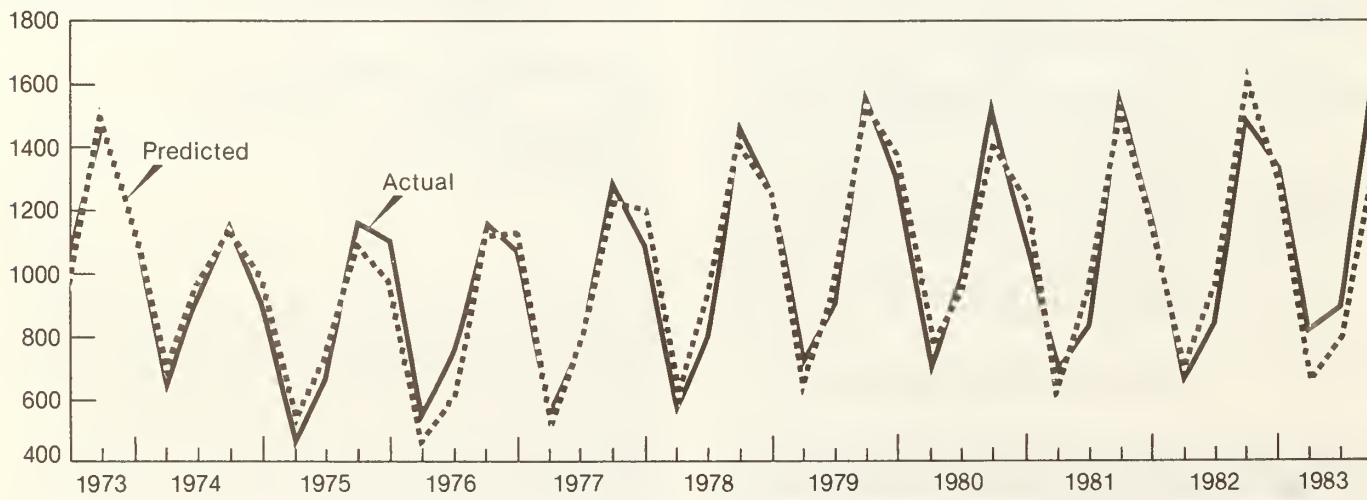
138 million bushels for October-December 1982 was more than offset later in the 1982/83 marketing year; under-predictions in the subsequent quarters resulted in a marketing-year feed and residual use estimate of 4,360 million bushels. This was 162 million bushels lower than reported corn feed and residual use, representing about a 4-percent error for the 1982/83 marketing year.

Summary and Implications

Feed demand for corn depends upon its own price, the prices of other feeds, and livestock price. Corn and soybean meal were found to be complements in animal feeding. Lags in the variables indicate that delays in livestock production adjustments are important for determining corn feed demand. The number of animals in the key livestock category—cattle-on-feed—also helps determine feed requirements. A change in cattle on feed leads to a change in feed and residual use of about 42 bushels per head.

For forecasting feed and residual use of corn, the equation developed here can be extremely useful. The lags in the model make short-term forecasting simpler than if all the explanatory variables are concurrent with the corn feed and residual use forecast. Moreover, the variables used are all routinely monitored in situation and outlook work, so acquiring the information needed to derive model forecasts should be easy.

Domestic feed and residual use of corn is a key element in the total outlook and situation for feed as well as for livestock markets. The situation for corn, as the dominant feed grain, is an important determinant of conditions in the markets for other feed grains, high-protein feeds, and livestock products.

References

Allen, R. D. G. *Mathematical Analysis for Economists.* New York: St. Martins Press, 1938.

Brandow, G. E. *Interrelations among Demands for Farm Products and Implications for Control of Market Supply.* Pennsylvania Agricultural Experiment Station Statistical Bulletin 680, University Park, 1961.

Butell, Robert and Abner Womack. *Quarterly Feed Demand for Corn.* Economic Research Service, USDA, ERS-649, Washington, D.C., 1977. Reprinted from the *Feed Situation*, Economic Research Service, USDA, Washington, D.C.: (FdS-259) November 1975, (FdS-260) February 1976, (FdS-261) May 1976, and (FdS-262) September 1976.

Hull, David B., Paul C. Westcott, and Roger L. Hoskin. "Factors Affecting Domestic Soybean Meal Use." Economic Research Service, USDA, Washington, D.C., *Oil Crops Outlook and Situation Report* (OCS-4) February 1984.

King, Gordon A. *The Demand and Price Structure for Byproduct Feeds.* USDA Technical Bulletin 1183, Washington, D.C. 1958.

USDA, Economic Research Service. *Feed Outlook and Situation Report*, Washington, D.C.: (FdS-271) November 1978 and (FdS-291) November 1983.

USDA, Economic Research Service. *Livestock and Poultry Outlook and Situation Report* (LPS-7), Washington, D.C., October 1983.

Table 1.--Feed grains: Marketing year supply, disappearance, area, and prices, 1979-84 1/

Year 2/	Supply				Disappearance							Ending stocks		
	Beginning stocks	Production	Imports	Total	Domestic use					Exports	Total disappearance	Govt. owned	Privately owned 3/	Total
					Food	Alc. beverages	Seed	Feed and residual	Total					
	Million metric tons													
1979/80	46.2	237.9	0.3	284.4	15.7	5.2	1.4	138.4	160.7	71.3	232.0	7.7	44.7	52.4
1980/81	52.4	198.0	0.3	250.7	17.1	5.4	1.3	123.0	146.8	69.3	216.1	7.1	27.5	34.6
1981/82	34.6	246.2	0.3	281.1	18.9	5.5	1.4	128.5	154.3	58.6	212.9	8.9	59.3	68.2
1982/83	68.2	250.2	0.3	318.7	20.5	6.0	1.4	139.5	167.4	54.0	221.4	34.2	63.1	97.3
1983/84 4/	97.3	136.0	0.6	233.9	22.8	5.6	1.5	121.1	151.0	55.4	206.4	7.4	20.1	27.5
1984/85*	27.5	235.3 (+16)	0.7	263.5 (+16)	- - 31.9 (+1) - -			127.4 (+10)	159.3 (+10)	60.6 (+6)	219.9 (+15)			43.6 (+10)

Year 2/	Area				Yield per harvested hectare	Index	Government-support program
	National program	Set-aside and diverted	Planted	Harvested for grain		Average price received by farmers 5/	Total payments to participants
	Million hectares				Metric tons	1977=100	Million dollars
1979/80	44.3	1.9	48.1	41.5	5.74	125	6/ 247
1980/81	42.7	---	49.1	41.1	4.82	154	7/ 412
1981/82	42.5	---	49.9	43.1	5.71	123	8/ 423
1982/83	---	1.3	49.1	42.9	5.83	136	8/ 418
1983/84 4/	---	15.6	41.5	32.4	4.20		6/ 1,097
1984/85	---	2.2	48.7	42.4	5.55		9/ 1,454

1/ Aggregated data on corn, sorghum, barley, and oats. 2/ The marketing year for corn and sorghum begins October 1; for oats and barley, June 1. 3/ Includes total Government loans (original and reseal). 4/ Preliminary. 5/ Excludes support payments. 6/ Deficiency and diversion payments. 7/ Disaster payments. 8/ Deficiency payments. 9/ Deficiency and disaster payments. *The probability is 2 out of 3 that the outcome will be within this range.

Table 2.--Corn: Marketing year supply and disappearance, area, and prices, 1979-84

Million bushels

Year beginning October 1	Supply: Beginning stocks	Supply: Production	Supply: Imports	Supply: Total	Domestic use: Food 1/	Domestic use: Alc. beverages 2/	Domestic use: Seed	Domestic use: Feed and residual	Domestic use: Total	Exports	Total disappearance	Ending stocks Sept. 30: Govt. owned	Ending stocks Sept. 30: Privately owned 3/	Ending stocks Sept. 30: Total
1979/80	1,303.9	7,928.1	1.1	9,233.1	582.8	72.3	20.0	4,508.3	5,183.4	2,432.6	7,616.0	256.3	1,360.8	1,617.1
1980/81	1,617.1	6,639.4	1.2	8,257.7	641.8	73.3	20.2	4,132.9	4,868.2	2,355.2	7,223.4	237.8	796.5	1,034.3
1981/82	1,034.3	8,118.7	1.2	9,154.2	709.4	82.7	19.4	4,201.8	5,013.3	1,966.9	6,980.2	302.4	1,871.6	2,174.0
1982/83	2,174.0	8,235.1	0.9	10,410.0	774.3	109.0	14.5	4,522.3	5,420.1	1,870.0	7,290.1	1,166.3	1,953.6	3,119.9
1983/84 4/	3,119.9	4,166.1	1.0	7,287.0	864.2	91.9	18.9	3,875.0	4,850.0	1,850.0	6,700.0	200.0	387.0	587.0
1984/85*	587.0	7,667.7 (+ 675)	1.0	8,255.7 (+ 675)	- - 1,050.0 - - (+ 30)			4,099.7 (+ 350)	5,149.7 (+ 365)	2,050.0 (+ 225)	7,199.7 (+ 500)			1,056.0 (+ 300)

Year beginning October 1	Area: Set-aside National program	Area: Set-aside and diverted	Area: Planted	Area: Harvested for grain	Yield per harvested acre	Received by farmers 5/	Average prices: St. Louis No. 2 Yellow	Average prices: Omaha No. 2 Yellow	Average prices: Gulf Ports No. 2 Yellow	Government-support program: National average loan rate	Government-support program: Target price	Government-support program: Total payments to participants
	- - - - Million acres - - - -				Bushels	- - - - - - - Dollars per bushel - - - - - - -						Mil. dol.
1979/80	85.7	2.9	81.4	72.4	109.5	2.52	2.73	2.49	3.02	2.10	2.20	8/ 126
1980/81	84.1	---	84.0	73.0	91.0	3.11	3.35	3.13	3.54	2.25	2.35	9/ 280
1981/82	80.5	---	84.1	74.5	108.9	2.50	2.61	2.46	2.83	2.40	2.40	9/ 92
1982/83	---	2.1	81.9	72.7	113.2	2.68	2.98	2.82	3.16	2.55	2.70	10/ 292
1983/84 4/	---	31.6	60.2	51.4	81.0	3.25	6/ 3.49	6/ 3.23	6/ 3.67	2.65	2.86	11/ 900
1984/85*	---	4.2	79.8	71.1	107.9	2.70-3.05				2.55	3.03	12/ 1,230

1/ Includes industrial products. 2/ Malt beverage and distilled liquor products converted to a corn basis. 3/ Includes quantity under loan and farmer-owned reserve. 4/ Preliminary. 5/ Excludes support payments. 6/ October 1983-July 1984 average. 7/ Deficiency, disaster, and diversion payments. 8/ Disaster and diversion payments. 9/ Disaster payments. 10/ Deficiency and disaster payments. 11/ Diversion payments. 12/ Deficiency payments. *The probability is 2 out of 3 that the outcome will be within this range.

Table 3.--Sorghum: Marketing year supply and disappearance, area, and prices, 1979-84

Year beginning October 1	Supply				Disappearance							Ending stocks Sept. 30		
	Begin- ning stocks	Produc- tion	Imports	Total	Domestic use					Exports	Total disap- pearance	Govt. owned	Privately owned 1/	Total
					Food	Alc. bever- ages	Seed	Feed and residual	Total					
								Million bushels						
1979/80	159.5	807.4	---	966.9	6.0	4.6	2.0	483.0	495.6	324.9	820.5	43.9	102.5	146.4
1980/81	146.4	579.3	---	725.7	5.0	4.3	2.0	301.3	312.6	304.6	617.2	38.2	70.3	108.5
1981/82	108.5	875.8	---	984.3	4.3	4.8	2.0	427.7	438.8	249.1	687.9	42.9	253.5	296.4
1982/83	296.4	835.1	---	1,131.5	4.2	3.9	1.8	507.1	517.0	214.3	731.3	175.6	224.6	400.2
1983/84 2/	400.2	479.2	---	879.4	4.2	3.8	2.0	390.4	400.4	250.0	650.4	80.0	149.0	229.0
1984/85*	229.0	820.9 (+ 62)	---	1,049.9 (+ 62)	-- 10.0 --			449.9 (+ 50)	459.9 (+ 50)	250.0 (+ 30)	709.9 (+ 70)			340.0 (+ 50)

	Area			Yield per harvested acre	Average prices				Government-support program		
	National program Set-aside and diverted	Planted	Harvested for grain		Received by farmers 3/	Kansas City No. 2 Yellow	Texas No. 2 Yellow	Gulf ports No. 2 Yellow	National average loan rate	Target price	Total payments to participants
	Million acres			Bushels	Dollars per cwt.						Mil. dol.
1979/80	1.2	15.3	12.9	62.6	4.18	4.65	4.97	5.54	3.57	4.18	5/ 99
1980/81	---	15.6	12.5	46.3	5.25	5.36	5.86	6.16	3.82	4.46	6/ 101
1981/82	---	15.9	13.7	64.0	4.27	4.29	4.85	4.97	4.07	4.55	7/ 268
1982/83	0.7	16.0	14.1	59.1	4.50	4.96	5.30	5.57	4.32	4.64	7/ 67
1983/84 2/	5.5	11.7	9.8	48.7	5.09	4/ 5.24	4/ 5.51	4/ 5.82	4.50	4.86	8/ 112
1984/85	0.7	16.2	14.2	57.8	4.29-4.91				4.32	5.14	9/ 150

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Excludes support payments. 4/ October 1983-July 1984 average. 5/ Deficiency, disaster, and diversion payments. 6/ Disaster payments. 7/ Deficiency and disaster payments. 8/ Diversion payments. 9/ Deficiency payments. *The probability is 2 out of 3 that the outcome will be within this range.

Table 4.--Barley: Marketing year supply and disappearance, area, and prices, 1979-84

Year beginning June 1	Supply				Disappearance								Ending stocks May 31		
	Begin-ning stocks	Produc-tion	Imports	Total	Domestic use					Exports	Total disap-pearance		Govt. owned	Privately owned 1/	Total
					Food	Alc. bever-ages	Seed	Feed and residual	Total						
	Million bushels														
1979/80	228.0	383.2	11.8	623.0	7.0	150.9	14.0	204.2	376.1	54.8	430.9		3.2	188.9	192.1
1980/81	192.1	361.1	10.2	563.4	7.0	155.3	13.2	173.9	349.4	76.7	426.1		3.4	133.9	137.3
1981/82	137.3	473.5	9.6	620.4	6.9	150.9	16.3	198.4	372.5	100.1	472.6		3.3	144.5	147.8
1982/83	147.8	515.9	10.7	674.4	7.2	145.5	17.4	240.4	410.5	47.2	457.7		6.0	210.7	216.7
1983/84 2/	216.7	508.3	7.1	732.1	7.0	147.3	19.9	277.6	451.8	91.5	543.3		11.9	176.9	188.8
1984/85*	188.8	601.1 (+31)	10.0	799.9 (+31)	- - 175.0 - - (+5)			249.9 (+25)	424.9 (+25)	100.0 (+15)	524.9 (+35)				275.0 (+35)

Year beginning June 1	Area			Yield per harvested acre	Average prices				Government-support program		
	National program Set-aside and diverted	Planted	Harvested for grain		Received by farmers 3/	Minneapolis		Portland	National average loan rate	Target price	Total payments to participants
						No. 2 or better, feed	No. 3 or better, malting	No. 2			
	Million acres			Bushels	Dollars per bushel				Mil. dol.		
1979/80	0.7	8.1	7.5	50.9	2.29	2.16	2.87	2.69	1.71	2.40	6/ 22
1980/81	---	8.3	7.3	49.7	2.86	2.60	3.64	3.34	1.83	2.55	7/ 31
1981/82	---	9.6	9.0	52.4	2.45	2.21	3.06	2.87	1.95	2.60	6/ 63
1982/83	0.4	9.5	9.0	57.2	2.23	1.76	2.53	2.52	2.08	2.60	8/ 60
1983/84 2/	1.1	10.4	9.7	52.3	2.50	2.48	2.84	2.91	2.16	2.60	9/ 72
1984/85	0.5	12.0	11.4	52.9	2.25-2.55	4/ 2.39	4/ 2.95	---	2.08	2.60	8/ 69

(National program column header also lists: 7.8, 8.7, 10.2, ---, ---, --- under "National program")

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Excludes support payments. 4/ June-July 1984 average. 5/ Deficiency, disaster, and diversion payments. 6/ Deficiency and disaster payments. 7/ Disaster payments. 8/ Deficiency payments. 9/ Deficiency and diversion payments. *The probability is 2 out of 3 that the outcome will be within this range.

Table 5.--Oats: Marketing year supply and disappearance, area, and prices, 1979-84

Year beginning June 1	Supply				Disappearance							Ending stocks May 31		
	Beginning stocks	Production	Imports	Total	Domestic use					Exports	Total disappearance	Govt. owned	Privately owned 1/	Total
					Food	Alc. beverages	Seed	Feed and residual	Total					
					Million bushels									
1979/80	280.0	526.7	0.9	807.6	40.7	---	34.6	491.8	567.1	4.1	571.2	2.7	233.7	236.4
1980/81	236.4	458.8	1.3	696.5	41.0	---	33.0	432.2	506.2	13.3	519.5	2.3	174.7	177.0
1981/82	177.0	509.5	1.6	688.1	41.2	---	35.4	453.0	529.6	6.6	536.2	0.7	151.2	151.9
1982/83	151.9	592.6	3.9	748.4	41.7	---	43.3	440.6	525.6	3.0	528.6	0.7	219.1	219.8
1983/84 2/	219.8	477.1	30.1	727.0	40.9	---	36.6	466.2	543.7	2.2	545.9	1.5	179.6	181.1
1984/85*	181.1	455.2 (+22)	30.0	666.3 (+22)	- - 80.0 - - (+5)		-	435.3 (+30)	515.3 (+35)	3.0	518.0 (+35)			148.0 (+30)

Year beginning June 1	Area			Yield per harvested acre	Average prices					Government-support program		
	Set-aside and diverted 3/	Planted	Harvested for grain		Received by farmers 4/	Minneapolis: No. 2 white, heavy	Portland: No. 2 white, heavy	Toledo: No. 2		National average loan rate	Target price	Total payments to participants
	Million acres			Bushels	Dollars per bushel					Mil. dol.		
1979/80	---	14.0	9.7	54.4	1.36	1.57	1.87	1.60		1.08	---	---
1980/81	---	13.4	8.7	53.0	1.79	2.04	2.42	2.17		1.16	---	---
1981/82	---	13.6	9.4	54.2	1.89	2.14	2.36	2.23		1.24	---	---
1982/83	0.1	14.0	10.3	57.8	1.48	1.69	2.18	1.55		1.31	1.50	---
1983/84 2/	0.3	20.3	9.1	52.6	1.69	1.87	1.95	2.01		1.36	1.60	6/ 13
1984/85	0.1	12.2	8.1	56.3	1.65-1.95 5/	5/ 1.88	5/ 2.05	5/ 2.06		1.31	1.60	7/ 5

1/ Includes quantity under loan and farmer-owned reserve. 2/ Preliminary. 3/ Not included in the program until 1982. 4/ Excludes support payments. 5/ June-July 1984 average. 6/ Deficiency and diversion payments. 7/ Deficiency payments. *The probability is 2 out of 3 that the outcome will be within this range.

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Table 6.--Feed grains: Feed year supply and disappearance, specified periods, 1979-84
(corn, sorghum, oats, barley)

Million metric tons

Year and periods beginning October 1	Supply				Disappearance							Ending stocks		
	Beginning stocks	Production	Imports	Total	Domestic use					Exports	Total disappearance	Privately owned 1/	Govt. owned	Total
					Food	Alc. beverages	Seed	Feed and residual	Total					
1979/80														
Oct.-Dec.	55.5	221.9	0.1	277.5	3.5	1.2	0.1	47.4	52.2	19.2	71.4	202.3	3.8	206.1
Jan.-Mar.	206.1	--	0.1	206.2	3.2	1.3	0.3	39.7	44.5	17.8	62.3	140.1	3.8	143.9
Apr.-May	143.9	--	2/	143.9	2.5	1.0	0.8	20.8	25.1	11.6	36.7	100.5	6.7	107.2
June-Sept.	107.2	14.5	2/	121.8	6.5	1.9	0.2	29.7	38.3	23.1	61.4	52.7	7.7	60.4
Mkt. year	55.5	236.4	0.3	292.2	15.7	5.4	1.4	137.6	160.1	71.7	231.8	52.7	7.7	60.4
1980/81														
Oct.-Dec.	60.4	183.4	0.1	243.9	3.7	1.2	0.1	45.6	50.6	20.5	71.1	165.1	7.7	172.8
Jan.-Mar.	172.8	--	0.1	172.9	3.2	1.3	0.3	32.0	36.8	18.7	55.5	109.8	7.6	117.4
Apr.-May	117.4	--	2/	117.4	2.8	1.0	0.8	20.8	25.4	11.3	36.7	73.1	7.6	80.7
June-Sept.	80.7	17.7	2/	98.5	7.5	1.8	0.2	24.8	34.3	18.8	53.1	38.3	7.1	45.4
Mkt. year	60.4	201.1	0.3	261.8	17.2	5.3	1.4	123.2	147.1	69.3	216.4	38.3	7.1	45.4
1981/82														
Oct.-Dec.	45.4	228.5	0.1	274.0	4.1	1.1	0.1	46.4	51.7	16.6	68.3	198.3	7.4	205.7
Jan.-Mar.	205.7	--	0.1	205.8	3.5	1.4	0.3	36.3	41.5	14.8	56.3	141.8	7.7	149.5
Apr.-May	149.5	--	0.1	149.6	3.1	1.0	0.9	19.8	24.8	11.2	36.0	105.7	7.9	113.6
June-Sept.	113.6	19.8	0.1	133.5	8.2	1.9	0.2	25.7	36.0	15.8	51.8	72.8	8.9	81.7
Mkt. year	45.4	248.3	0.4	294.1	18.9	5.4	1.5	128.2	154.0	58.4	212.4	72.8	8.9	81.7
1982/83														
Oct.-Dec	81.7	230.4	0.1	312.2	4.7	1.4	0.1	46.5	52.7	14.9	67.6	232.4	12.2	244.6
Jan.-Mar.	244.6	--	0.1	244.7	3.8	1.5	0.2	40.2	45.7	14.8	60.5	170.6	13.6	184.2
Apr.-May	184.2	--	0.1	184.3	3.3	1.0	0.9	24.4	29.6	8.3	37.9	132.4	14.0	146.4
June-Sept.	146.4	18.0	0.3	164.7	8.8	2.1	0.2	29.5	40.6	16.1	56.7	73.7	34.3	108.0
Mkt. year	81.7	248.4	0.6	330.7	20.6	6.0	1.4	140.6	168.6	54.1	222.7	73.7	34.3	108.0
1983/84														
Oct.-Dec.	108.0	118.0	0.1	226.1	5.3	1.2	0.1	49.1	55.7	15.7	71.4	118.4	36.3	154.7
Jan.-Mar.	154.7	--	0.2	154.9	4.3	1.4	0.2	29.4	35.3	15.5	50.8	68.9	35.2	104.1
Apr.-May	104.1	--	0.1	104.2	4.0	1.0	1.1	18.2	24.3	9.6	33.9	45.7	24.6	70.3
June-Sept.														
Mkt. year														

1/ Includes quantity under loan and farmer-owned reserve. 2/ Less than 50,000 metric tons.

Table 7.--Corn: Marketing year supply and disappearance, specified periods, 1979-84

Million bushels

Year and periods beginning October 1	Supply				Disappearance							Ending stocks		
	Begin-ning stocks	Produc-tion	Imports	Total	Domestic use					Exports	Total disap-pearance	Privately owned 3/	Govt. owned	Total
					Food 1/	Alc. bever-ages 2/	Seed	Feed and residual	Total					
1979/80														
Oct.-Dec.	1,303.9	7,928.1	0.3	9,232.3	128.2	16.3	---	1,544.7	1,689.2	662.9	2,352.1	6,780.5	99.7	6,880.2
Jan.-Mar.	6,880.2	---	0.3	6,880.5	116.6	18.4	4.0	1,305.9	1,444.9	582.0	2,026.9	4,752.4	101.2	4,853.6
Apr.-May	4,853.6	---	0.1	4,853.7	93.2	13.9	12.0	704.7	823.8	385.6	1,209.4	3,430.8	213.5	3,644.3
June-Sept.	3,644.3	---	0.4	3,644.7	244.8	23.7	4.0	953.0	1,225.5	802.1	2,027.6	1,360.8	256.3	1,617.1
Mkt. year	1,303.9	7,928.1	1.1	9,233.1	582.8	72.3	20.0	4,508.3	5,183.4	2,432.6	7,616.0	1,360.8	256.3	1,617.1
1980/81														
Oct.-Dec.	1,617.1	6,639.4	0.2	8,256.7	136.3	16.6	---	1,519.3	1,672.2	727.8	2,400.0	5,602.4	254.3	5,856.7
Jan.-Mar.	5,856.7	---	0.3	5,857.0	116.3	18.3	4.0	1,099.4	1,238.0	632.9	1,870.9	3,736.1	250.0	3,986.1
Apr.-May	3,986.1	---	0.1	3,986.2	106.7	13.8	12.2	684.3	817.0	395.7	1,212.7	2,521.9	251.6	2,773.5
June-Sept.	2,773.5	---	0.6	2,774.1	282.5	24.6	4.0	829.9	1,141.0	598.8	1,739.8	796.5	237.8	1,034.3
Mkt. year	1,617.1	6,639.4	1.2	8,257.7	641.8	73.3	20.2	4,132.9	4,868.2	2,355.2	7,223.4	796.5	237.8	1,034.3
1981/82														
Oct.-Dec.	1,034.3	8,118.7	0.4	9,153.4	153.2	16.8	---	1,517.2	1,687.2	545.5	2,232.7	6,673.1	247.6	6,920.7
Jan.-Mar.	6,920.7	---	0.3	6,921.0	128.4	20.2	3.9	1,180.9	1,333.4	489.4	1,822.8	4,836.5	261.7	5,098.2
Apr.-May	5,098.2	---	0.1	5,098.3	119.4	15.2	12.1	662.5	809.2	409.0	1,218.2	3,610.4	269.7	3,880.1
June-Sept.	3,880.1	---	0.4	3,880.5	308.4	30.5	3.4	841.2	1,183.5	523.0	1,706.5	1,871.6	302.4	2,174.0
Mkt. year	1,034.3	8,118.7	1.2	9,154.2	709.4	82.7	19.4	4,201.8	5,013.3	1,966.9	6,980.2	1,871.6	302.4	2,174.0
1982/83														
Oct.-Dec.	2,174.0	8,235.1	0.3	10,409.4	175.2	27.9	---	1,488.9	1,692.0	512.7	2,204.7	7,775.7	429.0	8,204.7
Jan.-Mar.	8,204.7	---	0.2	8,204.9	140.0	28.0	1.3	1,329.7	1,499.0	507.9	2,006.9	5,714.6	483.4	6,198.0
Apr.-May	6,198.0	---	0.1	6,198.1	125.0	17.6	10.3	812.8	965.7	308.5	1,274.2	4,432.2	491.7	4,923.9
June-Sept.	4,923.9	---	0.3	4,924.2	334.1	35.5	2.9	890.9	1,263.4	540.9	1,804.3	1,953.6	1,166.3	3,119.9
Mkt. year	2,174.0	8,235.1	0.9	10,410.0	774.3	109.0	14.5	4,522.3	5,420.1	1,870.0	7,290.1	1,953.6	1,166.3	3,119.9
1983/84														
Oct.-Dec.	3,119.9	4,166.1	0.3	7,286.3	200.3	19.7	---	1,630.0	1,850.0	528.9	2,378.9	3,677.7	1,229.7	4,907.4
Jan.-Mar.	4,907.4	---	0.8	4,908.2	160.0	22.4	1.1	967.6	1,151.1	509.8	1,660.9	2,049.1	1,198.2	3,247.3
Apr.-May	3,247.3	---	0.7	3,248.0	155.0	16.5	15.5	584.2	771.2	339.7	1,110.9	1,318.5	818.6	2,137.1
June-Sept.														
Mkt. year														

1/ Includes industrial products. 2/ Malt beverage and distilled liquor grain products converted to a corn basis. 3/ Includes quantity under loan and farmer-owned reserve.

Table 8.--Sorghum: Marketing year supply and disappearance, specified periods, 1979-84

Million bushels

Year and periods beginning October 1	Supply				Disappearance							Ending stocks		
					Domestic use							:Privately:		
	Begin- ning stocks	Produc- tion	Imports	Total	Food	Alc. bever- ages	Seed	Feed and residual	Total	Exports	Total disap- pearance	Govt. owned	owned 1/	Total
1979/80														
Oct.-Dec.	159.5	807.4	---	966.9	1.6	1.3	---	242.8	245.7	74.2	319.9	45.3	601.7	647.0
Jan.-Mar.	647.0	---	---	647.0	1.6	1.2	0.2	139.8	142.8	108.5	251.3	45.6	350.1	395.7
Apr.-May	395.7	---	---	395.7	1.4	0.7	1.2	54.5	57.8	60.3	118.1	45.6	232.0	277.6
June-Sept.	277.6	---	2/	277.6	1.4	1.4	0.6	45.9	49.3	81.9	131.2	43.9	102.5	146.4
Mkt. year	159.5	807.4	2/	966.9	6.0	4.6	2.0	483.0	495.6	324.9	820.5	43.9	102.5	146.4
1980/81														
Oct.-Dec.	146.4	579.3	2/	725.7	1.6	1.2	---	192.1	194.9	66.2	261.1	43.7	420.9	464.6
Jan.-Mar.	464.6	---	2/	464.6	1.6	0.9	0.2	63.9	66.6	84.1	150.7	43.5	270.4	313.9
Apr.-May	313.9	---	2/	313.9	0.8	0.7	1.2	85.0	87.7	41.7	129.4	43.8	140.7	184.5
June-Sept.	184.5	---	2/	184.5	1.0	1.5	0.6	-39.7	-36.6	112.6	76.0	38.2	70.3	108.5
Mkt. year	146.4	579.3	2/	725.7	5.0	4.3	2.0	301.3	312.6	304.6	617.2	38.2	70.3	108.5
1981/82														
Oct.-Dec.	108.5	875.8	2/	984.3	1.3	1.3	---	215.9	218.5	77.8	296.3	38.4	649.6	688.0
Jan.-Mar.	688.0	---	2/	688.0	1.3	1.3	0.2	149.4	152.2	74.3	226.5	38.2	423.3	461.5
Apr.-May	461.5	---	2/	461.5	0.5	0.8	1.2	57.7	60.2	21.8	82.0	38.3	341.2	379.5
June-Sept.	379.5	---	2/	379.5	1.2	1.4	0.6	4.7	7.9	75.2	83.1	42.9	253.5	296.4
Mkt. year	108.5	875.8	2/	984.3	4.3	4.8	2.0	427.7	438.8	249.1	687.9	42.9	253.5	296.4
1982/83														
Oct.-Dec	296.4	835.1	2/	1,131.5	1.4	1.0	---	251.6	254.0	67.0	321.0	46.7	763.8	810.5
Jan.-Mar.	810.5	---	2/	810.5	1.2	1.0	0.1	124.5	126.8	62.5	189.3	47.8	573.4	621.2
Apr.-May	621.2	---	---	621.2	0.4	0.6	0.8	76.2	78.0	14.1	92.1	54.0	475.1	529.1
June-Sept.	529.1	---	2/	529.1	1.2	1.3	0.9	54.8	58.2	70.7	128.9	175.6	224.6	400.2
Mkt. year	296.4	835.1	2/	1,131.5	4.2	3.9	1.8	507.1	517.0	214.3	731.3	175.6	224.6	400.2
1983/84														
Oct.-Dec.	400.2	479.2	---	879.4	1.3	1.0	---	164.5	166.8	62.1	228.9	189.3	461.2	650.5
Jan.-Mar.	650.5	---	---	650.5	1.3	0.7	0.2	103.4	105.6	77.8	183.4	175.3	291.8	467.1
Apr.-May	467.1	---	---	467.1	0.3	0.4	0.8	68.9	70.4	29.5	99.9	137.4	229.8	367.2
June-Sept.														
Mkt. year														

1/ Includes quantity under loan and farmer-owned reserve. 2/ Less than 50,000 bushels.

Table 9.--Barley: Marketing year supply and disappearance, specified periods, 1979-84

Year and periods beginning June 1	Supply				Disappearance							Ending stocks		
	Beginning stocks	Production	Imports	Total	Domestic use					Exports	Total disappearance	Govt. owned	Privately owned 1/	Total
					Food	Alc. beverages	Seed	Feed and residual	Total					
					Million bushels									
1979/80														
June-Sept.	228.0	383.2	3.7	614.9	2.5	51.9	1.1	87.5	143.0	9.9	152.9	2.9	459.1	462.0
Oct.-Dec.	462.0	---	2.8	464.8	1.7	34.0	2.0	39.0	76.7	22.4	99.1	3.1	362.6	365.7
Jan.-Mar.	365.7	---	3.2	368.9	1.7	37.0	3.4	53.3	95.4	11.1	106.5	3.3	259.1	262.4
Apr.-May	262.4	---	2.1	264.5	1.1	28.0	7.5	24.4	61.0	11.4	72.4	3.2	188.9	192.1
Mkt. year	228.0	383.2	11.8	623.0	7.0	150.9	14.0	204.2	376.1	54.8	430.9	3.2	188.9	192.1
1980/81														
June-Sept.	192.1	361.1	3.5	556.7	2.5	56.6	1.2	78.8	139.1	24.9	164.0	3.5	389.2	392.7
Oct.-Dec.	392.7	---	2.3	395.0	1.7	33.9	2.2	32.2	70.0	21.4	91.4	3.5	300.1	303.6
Jan.-Mar.	303.6	---	2.7	306.3	1.7	36.0	3.7	38.7	80.1	22.7	102.8	3.4	200.1	203.5
Apr.-May	203.5	---	1.7	205.2	1.1	28.8	6.1	24.2	60.2	7.7	67.9	3.4	133.9	137.3
Mkt. year	192.1	361.1	10.2	563.4	7.0	155.3	13.2	173.9	349.4	76.7	426.1	3.4	133.9	137.3
1981/82														
June-Sept.	137.3	473.5	2.4	613.2	2.5	54.5	1.3	75.6	133.9	32.6	166.5	3.3	443.4	446.7
Oct.-Dec.	446.7	---	2.4	449.1	1.7	32.1	2.3	50.7	86.8	33.0	119.8	3.3	326.0	329.3
Jan.-Mar.	329.3	---	2.7	332.0	1.7	37.2	4.0	41.7	84.6	23.1	107.7	3.3	221.0	224.3
Apr.-May	224.3	---	2.1	226.4	1.0	27.1	8.7	30.4	67.2	11.4	78.6	3.3	144.5	147.8
Mkt. year	137.3	473.5	9.6	620.4	6.9	150.9	16.3	198.4	372.5	100.1	472.6	3.3	144.5	147.8
1982/83														
June-Sept.	147.8	515.9	5.1	668.8	2.5	51.3	1.3	92.2	147.3	25.4	172.7	3.9	492.2	496.1
Oct.-Dec.	496.1	---	1.9	498.0	1.8	32.1	2.8	40.7	77.4	6.5	83.9	4.8	409.3	414.1
Jan.-Mar.	414.1	---	2.2	416.3	1.8	35.5	3.9	68.5	109.7	12.7	122.4	5.8	288.1	293.9
Apr.-May	293.9	---	1.5	295.4	1.1	26.6	9.4	39.0	76.1	2.6	78.7	6.0	210.7	216.7
Mkt. year	147.8	515.9	10.7	674.4	7.2	145.5	17.4	240.4	410.5	47.2	457.7	6.0	210.7	216.7
1983/84														
June-Sept.	216.7	508.3	3.4	728.4	2.5	53.8	1.2	132.0	189.5	23.4	212.9	9.3	506.2	515.5
Oct.-Dec.	515.5	---	1.5	517.0	1.7	32.8	2.4	80.2	117.1	32.9	150.0	11.4	355.6	367.0
Jan.-Mar.	367.0	---	1.2	368.2	1.7	35.2	3.9	33.9	74.7	25.1	99.8	12.0	256.4	268.4
Apr.-May	268.4	---	1.0	269.4	1.1	25.5	12.4	31.5	70.5	10.1	80.6	11.9	176.9	188.8
Mkt. year	216.7	508.3	7.1	732.1	7.0	147.3	19.9	277.6	451.8	91.5	543.3	11.9	176.9	188.8

1/ Includes quantity under loan and farmer-owned reserve.

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Table 10.--Oats: Marketing year supply and disappearance, specified periods, 1979-84

Year and periods beginning June 1	Supply				Disappearance								Ending stocks		
	Begin-ning stocks	Produc-tion	Imports	Total	Domestic use					Exports	Total disap-pearance		Govt. owned	Privately owned 1/	Total
					Food	Alc. bever-ages	Seed	Feed and residual	Total						
					Million bushels										
1979/80															
June-Sept.	280.0	526.7	0.3	807.0	14.6	---	1.7	221.9	238.2	0.9	239.1		2.6	565.3	567.9
Oct.-Dec.	567.9	---	0.2	568.1	10.4	---	1.7	77.3	89.4	1.9	91.3		2.6	474.2	476.8
Jan.-Mar.	476.8	---	0.2	477.0	10.3	---	6.9	119.7	136.9	0.5	137.4		2.7	336.9	339.6
Apr.-May	339.6	---	0.2	339.8	5.4	---	24.3	72.9	102.6	0.8	103.4		2.7	233.7	236.4
Mkt. year	280.0	526.7	0.9	807.6	40.7	---	34.6	491.8	567.1	4.1	571.2		2.7	233.7	236.4
1980/81															
June-Sept.	236.4	458.8	0.6	695.8	15.0	---	1.8	190.4	207.2	3.9	211.1		2.7	482.0	484.7
Oct.-Dec.	484.7	---	0.2	484.9	10.0	---	1.8	79.2	91.0	2.8	93.8		2.7	388.4	391.1
Jan.-Mar.	391.1	---	0.3	391.4	10.0	---	7.0	115.6	132.6	2.6	135.2		2.5	253.7	256.2
Apr.-May	256.2	---	0.2	256.4	6.0	---	22.4	47.0	75.4	4.0	79.4		2.3	174.7	177.0
Mkt. year	236.4	458.8	1.3	696.5	41.0	---	33.0	432.2	506.2	13.3	519.5		2.3	174.7	177.0
1981/82															
June-Sept.	177.0	509.5	0.3	686.8	16.0	---	2.0	207.2	225.2	3.2	228.4		1.7	456.7	458.4
Oct.-Dec.	458.4	---	0.2	458.6	10.0	---	2.0	80.2	92.2	1.2	93.4		1.7	363.5	365.2
Jan.-Mar.	365.2	---	0.2	365.4	10.0	---	7.3	111.4	128.7	1.2	129.9		1.7	233.8	235.5
Apr.-May	235.5	---	0.9	236.4	5.2	---	24.1	54.2	83.5	1.0	84.5		0.7	151.2	151.9
Mkt. year	177.0	509.5	1.6	688.1	41.2	---	35.4	453.0	529.6	6.6	536.2		0.7	151.2	151.9
1982/83															
June-Sept.	151.9	592.6	0.8	745.3	16.2	---	2.0	167.7	185.9	1.3	187.2		0.6	557.5	558.1
Oct.-Dec.	558.1	---	0.2	558.3	10.0	---	2.0	92.0	104.0	1.0	105.0		0.7	452.6	453.3
Jan.-Mar.	453.3	---	1.6	454.9	10.7	---	7.6	117.3	135.6	0.3	135.9		0.7	318.3	319.0
Apr.-May	319.0	---	1.3	320.3	4.8	---	31.7	63.6	100.1	0.4	100.5		0.7	219.1	219.8
Mkt. year	151.9	592.6	3.9	748.4	41.7	---	43.3	440.6	525.6	3.0	528.6		0.7	219.1	219.8
1983/84															
June-Sept.	219.8	477.1	11.7	708.6	15.8	---	1.9	184.9	202.6	0.8	203.4		1.1	504.1	505.2
Oct.-Dec.	505.2	---	4.9	510.1	9.9	---	1.9	118.7	130.5	0.7	131.2		1.4	377.5	378.9
Jan.-Mar.	378.9	---	10.6	389.5	10.5	---	7.4	101.2	119.1	0.3	119.4		1.5	268.6	270.1
Apr.-May	270.1	---	2.9	273.0	4.7	---	25.4	61.4	91.5	0.4	91.9		1.5	179.6	181.1
Mkt. year	219.8	477.1	30.1	727.0	40.9	---	36.6	466.2	543.7	2.2	545.9		1.5	179.6	181.1

1/ Includes quantity under loan and farmer-owned reserve.

Table 11.--Average prices received by farmers, United States, by months, 1979-84

Item and year beginning October 1	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Average weighted by sales 1/
	Dollars per bushel												
Corn													
1979	2.41	2.27	2.38	2.45	2.39	2.40	2.36	2.42	2.49	2.73	2.92	3.01	2.52
1980	2.99	3.10	3.19	3.19	3.22	3.25	3.24	3.24	3.17	3.14	2.87	2.55	3.11
1981	2.45	2.34	2.39	2.54	2.44	2.46	2.55	2.60	2.57	2.50	2.30	2.15	2.50
1982	1.98	2.13	2.26	2.36	2.56	2.71	2.95	3.03	3.04	3.13	3.35	3.32	2.68
1983	3.15	3.17	3.15	3.15	3.11	3.21	3.32	3.34	3.37	*3.32			
Sorghum													
	Dollars per cwt												
1979	3.90	3.99	3.90	4.05	3.98	4.05	3.96	4.04	4.49	4.95	5.12	5.12	4.18
1980	5.36	5.48	5.49	5.48	5.33	5.17	5.25	5.16	5.03	4.84	4.55	4.07	5.25
1981	3.90	3.87	3.95	4.09	4.08	4.00	4.10	4.35	4.17	3.96	3.95	3.80	4.27
1982	3.70	3.78	3.97	4.09	4.42	4.67	4.92	5.05	5.05	5.03	5.29	5.26	4.50
1983	5.01	4.98	4.93	4.93	4.74	4.85	5.00	5.08	4.95	*4.86			

Item and year beginning June 1	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Average weighted by sales 1/
	Dollars per bushel												
Oats													
1979	1.35	1.33	1.24	1.29	1.31	1.41	1.31	1.39	1.37	1.34	1.38	1.43	1.36
1980	1.48	1.50	1.53	1.63	1.65	1.84	1.92	1.98	2.01	2.08	2.05	2.05	1.79
1981	1.99	1.84	1.72	1.74	1.78	1.88	1.94	1.97	1.99	2.02	1.99	1.99	1.89
1982	1.88	1.57	1.39	1.35	1.32	1.40	1.44	1.46	1.48	1.48	1.54	1.54	1.48
1983	1.51	1.46	1.45	1.55	1.62	1.67	1.73	1.81	1.88	1.82	1.82	1.84	1.69
1984	1.80	*1.77											
Barley													
1979	2.30	2.22	2.23	2.33	2.32	2.40	2.32	2.27	2.23	2.18	2.15	2.21	2.29
1980	2.36	2.52	2.59	2.65	2.81	2.90	2.97	3.09	3.05	3.04	3.04	3.00	2.86
1981	2.94	2.41	2.37	2.44	2.38	2.49	2.48	2.50	2.40	2.40	2.42	2.53	2.45
1982	2.39	2.16	2.20	2.17	1.98	2.06	2.19	2.16	2.00	2.09	2.22	2.37	2.23
1983	2.32	2.20	2.34	2.46	2.53	2.55	2.55	2.55	2.47	2.50	2.55	2.78	2.50
1984	2.63	*2.38											

Item and year beginning May 1	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Average weighted by sales
	Dollars per ton												
Hay (mid-month)													
1979	65.60	58.00	56.00	57.50	59.00	60.80	58.90	60.10	59.10	60.00	57.40	60.10	59.50
1980	69.30	65.10	67.00	67.20	71.90	77.20	75.00	74.80	72.80	72.50	69.80	68.20	71.00
1981	75.30	66.90	64.00	63.90	62.70	64.80	65.40	65.70	67.90	69.90	69.50	73.30	67.10
1982	77.50	69.60	66.10	65.00	66.80	67.10	68.70	68.60	70.50	73.50	70.10	74.20	68.80
1983	83.90	75.30	72.70	72.60	75.40	78.50	76.60	77.90	80.00	81.20	80.50	82.50	76.20
1984	84.90	78.70	71.80										

1/ Includes an allowance for unredeemed loans and purchase agreement deliveries valued at the average loan rate, by States; excludes Government payments.
*Preliminary.

Source: Agricultural Prices, Crop Reporting Board, USDA.

Table 12.--Cash prices at principal markets, 1979-84

Item and year beginning October 1	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Simple average

Dollars per bushel

CORN No. 2 Yellow, St. Louis 1/

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Simple average
1979	2.59	2.51	2.66	2.50	2.64	2.54	2.53	2.60	2.66	3.01	3.31	3.26	2.73
1980	3.35	3.53	3.59	3.60	3.47	3.42	3.49	3.42	3.33	3.34	3.03	2.61	3.35
1981	2.53	2.59	2.54	2.65	2.61	2.66	2.78	2.78	2.75	2.68	2.42	2.32	2.61
1982	2.12	2.43	2.49	2.52	2.79	2.99	3.24	3.24	3.27	3.39	3.68	3.60	2.98
1983	3.50	3.53	3.45	3.41	3.31	3.55	3.61	3.58	3.57	3.43			

CORN No. 2 Yellow, Omaha

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Simple average
1979	2.37	2.32	2.36	2.26	2.33	2.23	2.32	2.43	2.50	2.81	2.98	3.01	2.49
1980	3.16	3.34	3.30	3.29	3.18	3.17	3.24	3.24	3.19	3.15	2.79	2.51	3.13
1981	2.44	2.39	2.37	2.47	2.45	2.48	2.61	2.65	2.65	2.54	2.23	2.23	2.46
1982	2.12	2.35	2.37	2.42	2.62	2.82	3.09	3.10	3.11	3.18	3.39	3.32	2.82
1983	3.23	3.24	3.17	3.11	3.03	3.25	3.33	3.35	3.37	3.22			

SORGHUM No. 2 Yellow, Kansas City   Dollars per cwt

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Simple average
1979	4.42	4.41	4.57	4.21	4.35	4.20	4.15	4.31	4.49	5.36	5.71	5.61	4.65
1980	5.65	5.91	5.82	5.79	5.52	5.46	5.49	5.38	5.23	5.29	4.58	4.16	5.36
1981	4.14	4.14	4.27	4.44	4.26	4.28	4.45	4.48	4.50	4.38	4.02	4.06	4.29
1982	3.85	4.25	4.37	4.54	4.87	5.08	5.30	5.37	5.37	5.32	5.69	5.55	4.96
1983	5.37	5.25	5.16	5.09	5.03	5.40	5.36	5.39	5.40	4.95			

Item and year beginning June 1	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Simple average

Dollars per bushel

OATS No. 2 Heavy, Minneapolis

	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Simple average
1979	1.68	1.60	1.47	1.55	1.65	1.67	1.59	1.52	1.50	1.48	1.52	1.62	1.57
1980	1.67	1.80	1.70	1.86	1.96	2.15	2.16	2.20	2.25	2.23	2.21	2.23	2.04
1981	2.18	2.02	1.99	2.02	2.09	2.28	2.10	2.23	2.26	2.16	2.21	2.16	2.14
1982	2.12	1.87	1.53	1.51	1.51	1.67	1.67	1.67	1.63	1.63	1.73	1.71	1.69
1983	1.67	1.60	1.79	1.94	2.00	1.97	1.94	1.98	1.82	1.87	1.89	1.96	1.87
1984	1.92	1.84											

BARLEY No. 2 or Better Feed, Minneapolis

	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Simple average
1979	2.16	2.39	2.15	2.22	2.34	2.11	2.15	2.09	2.04	2.06	2.12	2.09	2.16
1980	2.15	2.48	2.39	2.43	2.77	3.03	2.75	2.81	2.90	2.63	2.51	2.39	2.60
1981	2.09	2.26	2.35	2.21	2.26	2.31	2.06	2.20	2.27	2.16	2.16	2.24	2.21
1982	2.12	1.85	1.72	1.69	1.54	1.58	1.59	1.63	1.72	1.73	2.01	1.95	1.76
1983	1.96	1.95	2.42	2.61	2.60	2.53	2.39	2.55	2.56	2.65	2.74	2.77	2.48
1984	2.59	2.18											

BARLEY No. 3 or Better Malting, 65% or Better Plump, Minneapolis

	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Simple average
1979	2.80	2.82	2.67	3.10	3.18	3.06	2.93	2.87	2.81	2.69	2.73	2.82	2.87
1980	2.99	3.36	3.27	3.63	3.80	3.88	3.77	3.75	3.83	3.71	3.84	3.80	3.64
1981	3.34	2.95	3.15	3.05	3.02	3.07	2.92	3.00	3.14	2.99	2.98	3.05	3.06
1982	2.93	2.63	2.48	2.37	2.42	2.45	2.37	2.38	2.42	2.45	2.68	2.76	2.53
1983	2.60	2.54	2.76	2.90	2.96	2.95	2.77	2.85	2.76	2.91	3.04	3.06	2.84
1984	3.04	2.86											

Source: Grain and Feed Market News, AMS, USDA.

Table 13.--Feed-price ratios for livestock, poultry, and milk, by months, 1979-84

Item and year beginning October 1	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Average
HOG/CORN, U.S. basis 1/													
1979	14.0	15.2	15.5	14.8	15.4	13.9	11.9	11.8	13.3	15.1	15.8	15.3	14.3
1980	15.8	14.7	13.7	12.8	12.8	11.9	12.0	12.6	15.0	15.7	17.1	19.1	14.4
1981	18.4	17.7	16.3	17.1	19.8	19.8	20.1	21.8	22.4	23.1	26.6	28.5	21.0
1982	28.2	24.6	23.7	23.4	21.9	18.6	15.9	15.1	14.4	13.9	13.9	13.3	18.9
1983 2/	12.8	11.8	14.0	15.3	14.6	14.3	14.1	14.2	14.5	15.7			
BEEF-STEER/CORN, Omaha 3/													
1979	27.8	28.9	29.1	29.4	29.0	30.0	27.2	26.6	26.6	25.1	24.3	23.1	27.3
1980	21.3	19.5	19.5	19.1	19.3	19.4	20.0	20.6	21.4	21.5	23.8	26.0	21.0
1981	25.2	25.0	25.0	24.6	25.9	26.5	26.5	27.2	26.5	26.1	29.2	27.5	26.3
1982	27.7	25.1	25.2	24.5	23.4	22.7	21.9	21.8	21.2	19.6	18.1	17.8	22.4
1983 2/	18.4	18.3	19.8	21.6	22.1	21.1	20.4	19.7	19.1	20.4			
MILK/FEED, U.S. basis 4/													
1979	1.55	1.59	1.54	1.54	1.56	1.56	1.55	1.53	1.50	1.48	1.42	1.40	1.52
1980	1.43	1.40	1.39	1.39	1.39	1.41	1.39	1.35	1.36	1.40	1.43	1.48	1.40
1981	1.53	1.56	1.54	1.55	1.53	1.53	1.51	1.46	1.47	1.47	1.50	1.57	1.52
1982	1.61	1.62	1.60	1.59	1.56	1.55	1.49	1.45	1.43	1.45	1.41	1.36	1.51
1983 2/	1.39	1.36	1.34	1.33	1.33	1.33	1.32	1.32	1.31	1.34			
EGG/FEED, U.S. basis 5/													
1979	6.1	6.8	7.3	6.6	6.0	6.4	6.0	5.4	5.6	5.7	6.0	6.2	6.1
1980	5.7	6.0	6.6	5.9	5.7	5.6	5.9	5.2	5.2	5.5	5.8	6.4	5.8
1981	6.5	7.2	6.7	6.6	6.8	7.1	6.6	5.6	5.3	5.7	5.4	6.0	6.3
1982	6.3	6.3	6.0	5.7	5.8	6.1	5.8	6.0	5.8	5.7	6.1	6.0	6.0
1983 2/	6.2	6.9	7.6	8.8	8.6	7.4	8.5	6.4	5.8	5.7			
BROILER/FEED, U.S. basis 6/													
1979	2.2	2.6	2.7	2.8	2.6	2.5	2.3	2.6	2.6	3.3	3.0	2.9	2.7
1980	2.8	2.5	2.5	2.6	2.6	2.6	2.3	2.4	2.6	2.6	2.5	2.4	2.5
1981	2.4	2.4	2.3	2.6	2.6	2.6	2.5	2.6	2.7	2.6	2.5	2.6	2.5
1982	2.5	2.5	2.5	2.6	2.7	2.4	2.3	2.4	2.6	2.8	2.8	2.7	2.6
1983 2/	2.5	2.8	2.8	3.0	3.1	3.1	2.8	2.7	2.7	3.0			
TURKEY/FEED, U.S. basis 7/													
1979	3.9	4.5	4.3	3.8	3.6	3.5	3.4	3.1	3.1	3.5	3.5	3.7	3.7
1980	4.0	3.9	3.5	3.1	3.1	3.2	3.0	3.0	3.3	3.3	3.2	3.1	3.3
1981	2.8	3.1	2.9	3.0	3.0	3.0	3.0	2.9	3.2	3.4	3.5	3.8	3.1
1982	3.9	3.9	3.0	2.9	2.9	2.9	2.7	2.9	3.0	2.8	2.8	3.0	3.0
1983 2/	3.0	3.1	3.5	3.6	3.2	3.3	3.4	3.3	3.3	3.6			

1/ Bushels of corn equal in value to 100 pounds of hog, live weight.
2/ Preliminary.
3/ Based on price of choice beef-steers, 900-1,100 pounds.
4/ Pounds of 16 percent mixed dairy feed equal in value to 1 pound whole milk.
5/ Pounds of laying feed equal in value to 1 dozen eggs.
6/ Pounds of broiler grower feed equal in value to 1 pound broiler, live weight.
7/ Pounds of turkey grower feed equal in value to 1 pound turkey, live weight.

Source: Agricultural Prices, Crop Reporting Board, USDA.

Table 14.--Price trends, selected feeds, and corn products

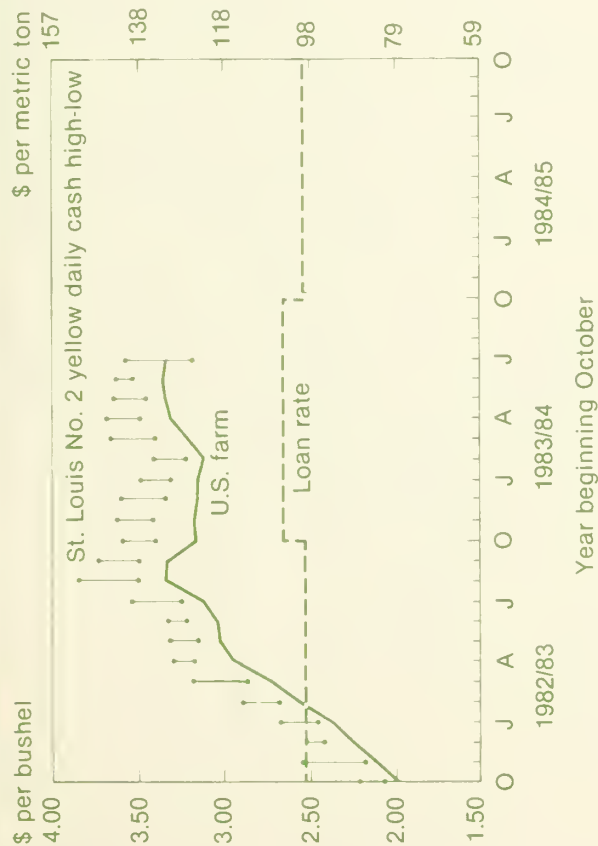| Item	Unit	Oct.-Sept. 1982/83 1/	1984				
			Mar.	Apr.	May	June	July
WHOLESALE, MOSTLY BULK 2/							
Soybean meal, 44% solvent, Decatur	$/ton	187	196	190	187	174	158
Soybean meal, high protein, Decatur	"	201	211	206	204	191	173
Cottonseed meal, 41% solvent, Memphis	"	177	187	194	190	178	169
Linseed meal, 34% solvent, Minneapolis	"	145	138	135	137	129	116
Peanut meal, Southeast mills	"	198	207	218	214	210	---
Meat meal, Ill. prod. pts.	"	219	223	209	210	195	175
Fishmeal, 65% protein, East Coast	"	362	384	381	360	354	329
Gluten feed, Chicago	"	118	111	114	106	84	80
Gluten meal, 60% protein, Chicago	"	251	245	256	271	266	237
Brewers' dried grains, Milwaukee	"	106	124	106	98	102	88
Distillers' dried grain, Lawrenceburg, Ky.	"	145	174	166	168	166	157
Feather meal, Arkansas Pts.	"	239	282	243	233	205	184
Wheat bran, Kansas City	"	88	93	91	85	75	78
Wheat middlings, Kansas City	"	88	93	91	85	75	78
Rice bran, f.o.b. mills, Arkansas	"	70	80	79	64	64	66
Hominy feed, Ill. pts.	"	97	108	110	103	103	97
Alfalfa meal, dehy., Kansas City	"	121	141	142	143	117	110
Cane molasses, New Orleans	"	49	73	73	70	69	59
Molasses beet pulp, Los Angeles	"	122	---	123	122	121	125
Animal fat, Ill. prod. pts.	c/lb.	13.1	17.9	17.6	19.5	20.5	17.6
Urea, 42% N., Fort Worth	$/ton	213	225	210	204	204	204
Corn, No. 2 white, Kansas City	$/bu.	3.35	4.85	4.85	4.85	4.50	4.56
PRICES PAID, U.S. BASIS 3/							
Soybean meal, 44%	$/cwt.	13.58	14.50	14.50	14.20	13.60	13.00
Cottonseed meal, 41%	"	13.79	15.90	16.00	15.80	15.40	15.20
Wheat bran	"	9.80	10.60	10.50	10.40	10.40	10.20
Wheat middlings	"	9.40	10.20	10.10	9.99	9.83	9.52
Broiler grower feed	$/ton	213	242	246	246	243	233
Laying feed	"	195	214	214	214	212	209
Turkey grower feed	"	237	252	258	258	254	246
Chick starter	"	218	239	241	233	229	235
Dairy feed, 16%	"	180	199	199	197	195	192
Beef cattle concentrate, 32-36% protein	$/cwt.	11.87	13.40	13.10	12.70	12.60	12.40
Hog concentrate, 38-42% protein	"	15.18	16.00	15.90	15.60	15.30	14.50
Stock salt	"	6.17	6.54	6.56	6.37	6.29	6.28
CORN PRODUCTS, WHOLESALE 4/							
Corn meal, New York White	$/cwt.	14.76	21.39	21.55	21.64	19.22	18.36
Yellow	"	12.73	14.28	14.69	14.71	14.91	14.73
Grits (brewers'), Chicago	"	9.84	11.33	11.72	11.71	11.92	11.74
Syrup, Chicago West	c/lb.	12.73	12.69	13.08	13.23	13.69	14.06
Sugar (dextrose), Chicago West	"	24.23	24.15	24.00	24.25	24.25	24.25
High-fructose (dried weight in tank cars), Chicago West	"	15.65	18.81	19.37	19.37	19.79	21.48
Corn starch, f.o.b. Midwest	$/cwt.	10.71	13.26	13.98	14.53	14.30	14.69

1/ Preliminary. 2/ Grain and Feed Market News, AMS, USDA, except urea which is from Feedstuffs, Miller Publishing Co., Minneapolis, Minnesota. 3/ Agricultural Prices, ERS, USDA. 4/ Milling and Baking News, Kansas City, Missouri, except starch which is from industry sources.

Table 15.--Feed concentrate balance, number of animal units,
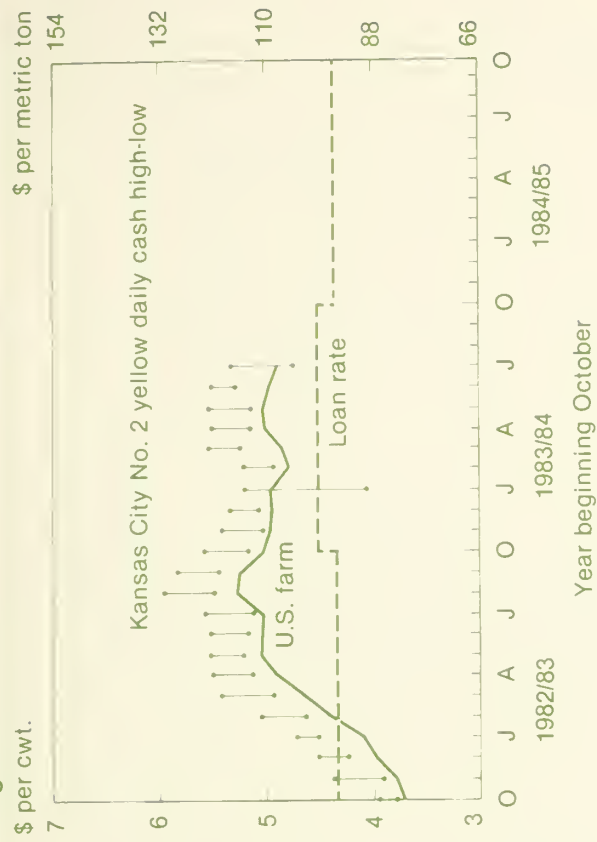and feed per unit, annual, 1977-84

Item	Year beginning October							
	1977	1978	1979	1980	1981	1982	1983 1/	1984 2/
	Million metric tons							
Feed Grains								
October 1 stocks	43.6	52.7	55.5	60.4	45.5	68.2	97.3	26.2
Production								
Corn	165.2	184.6	201.6	168.8	208.4	209.2	105.8	198.4
Sorghum	19.8	18.6	20.5	14.7	22.3	21.2	12.2	19.4
Oats	8.4	7.6	6.6	7.3	9.0	8.6	6.9	6.6
Barley	9.9	8.3	7.9	10.4	11.4	11.2 ~	11.1	13.6
Total	203.3	219.1	236.6	201.2	251.1	250.2	136.0	238.0
Imports	.3	.3	.3	.3	.3	.3	.3	.3
Wheat fed	6.2	4.1	2.6	2.7	3.1	7.8	12.1	9.5
Rye fed	.3	.2	.2	.2	.1	.1	.1	.1
Byproduct feeds fed	33.8	34.5	38.1	37.9	37.4	37.2	38.9	38.0
Total supply	287.5	310.9	333.3	302.7	337.5	363.8	284.7	312.1
Concentrates fed								
Corn	95.1	109.8	114.8	105.1	99.7	114.9	99.7	105.4
Sorghum	11.6	13.8	12.3	7.7	11.0	12.9	9.9	10.8
Oats	7.5	7.6	6.7	6.5	5.0	6.4	6.8	6.3
Barley	4.3	4.8	4.3	3.7	4.4	5.2	6.1	5.4
Wheat and rye	6.5	4.3	2.8	2.9	3.9	7.9	12.2	9.6
Oilseed meals	16.8	18.4	19.5	16.3	18.1	19.1	17.0	17.0
Animal protein, feeds	2.8	2.1	2.3	2.5	3.0	2.9	2.9	3.0
Grain protein feeds	1.7	1.8	1.2	1.0	1.6	2.0	2.1	2.2
Other byproduct feeds	12.6	12.4	12.0	12.4	11.2	10.9	10.8	11.0
Total	158.9	175.0	175.9	158.1	157.9	182.2	167.5	170.7
	Million units							
Grain-consuming animal units (GCAU's)								
Dairy cattle	12.1	12.0	12.1	12.2	12.3	12.4	12.2	12.0
Cattle on feed	20.6	20.3	18.8	17.8	16.3	18.4	17.8	17.5
Other cattle	4.8	4.5	4.6	4.8	4.9	4.8	4.7	4.8
Hogs	19.6	21.7	23.8	22.3	20.2	20.3	20.9	18.9
Poultry	18.8	20.1	21.1	21.6	21.8	20.6	20.5	20.5
Other livestock	1.8	1.8	1.9	2.0	2.0	2.0	2.1	2.0
Total	77.7	80.4	82.3	80.7	77.5	78.5	78.2	75.7
	Tons per unit							
Concentrates fed/GCAU								
Four feed grains	1.53	1.69	1.68	1.52	1.55	1.78	1.57	1.69
All concentrates	2.05	2.18	2.14	1.96	2.04	2.32	2.14	2.25

1/ Preliminary. 2/ Forecast (8/6/84).

Corn Prices

$ per bushel $ per metric ton

St. Louis No. 2 yellow daily cash high-low

U.S. farm

Loan rate

Year beginning October

1982/83   1983/84   1984/85

Sorghum Prices

$ per cwt. $ per metric ton

Kansas City No. 2 yellow daily cash high-low

U.S. farm

Loan rate

Year beginning October

1982/83   1983/84   1984/85

Barley Prices

$ per bushel $ per metric ton

Minneapolis No. 2 feed daily cash high-low

U.S. farm

Loan rate

Year beginning June

1982/83   1983/84   1984/85

Oat Prices

$ per bushel $ per metric ton

Minneapolis No. 2 hvy. daily cash high-low

U.S. farm

Loan rate

Year beginning June

1982/83   1983/84   1984/85

LIST OF TABLES